
Message from the Ministers

For almost sixty years, ABARE has been producing innovative and relevant economic research in partnership with industry and government. We are pleased to be part of the partnership and we bring to it a deep appreciation of ABARE's contribution in providing the information to support good decision making and sound industry development.

Australia's rural and resource industries rely on ABARE's first class research, policy analysis and commodity forecasts. ABARE is the only body still producing medium term and regular quarterly forecasts for Australia's major export commodities. This journal, *Australian Commodities*, continues to be our key stakeholders' premier source of information on the economic issues driving the global competitiveness of our agriculture, minerals, energy, fishing and forestry industries.

As Australia's leading applied economic research agency, ABARE has a vital role to play as a public information provider — a role that has become even more critical as many statutory marketing authorities have been privatised and as public companies have become more guarded in releasing 'sensitive' business information.

ABARE's sound and objective research findings remain an invaluable basis for rational decision making in our portfolio industries.

The agency continues to make a vital contribution to some of the most important items on the domestic and global agendas: multilateral trade negotiations; climate change response policies; salinity management and water policy reform; more open agricultural markets; energy market reform; and issues in regional Australia.

Not only is ABARE's contribution to the policy debate critical, it is vital that ABARE's program of research and public release of results remains professionally independent of government.

As ministers, we may not at times agree with all of ABARE's findings but we recognise that economic analysis has a crucial role to play in the community debate on topical issues.

Our job is made easier as a result of ABARE's reliable and high quality output. We look forward to the enormous benefits that ABARE will continue to bring to the Australian economy and the decision making processes of the nation.



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commodities australian

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Commodity overview

In the aftermath of the September terrorist attacks in the United States



September's terrorist attacks in the United States adversely affected business and consumer confidence in that country, contributing significantly to a weaker world economic outlook. World economic growth is assumed to be 1.9 per cent in 2002, little different from this year's subdued rate.



Economic developments in the United States will be critical to the world economic outlook. Despite significant fiscal and monetary stimulus, economic activity in the United States is likely to remain weak in the short term.



A relatively weak Australian exchange rate is expected to offset the adverse effects of lower prices on world markets.

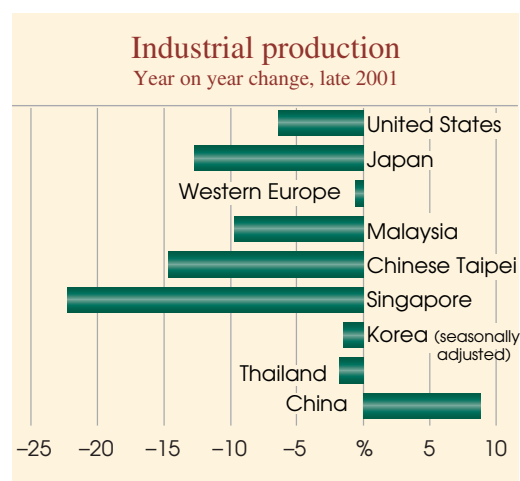
World economic outlook

World economic prospects weakened by terrorist attacks

The terrorist attacks in New York and Washington DC on 11 September 2001, and the subsequent 'war against terrorism', have significantly affected the outlook for world economic growth. Economic indicators released since the September attacks have suggested a marked decline in activity in the major world economies.

In the United States, for example, industrial production recorded a monthly decline of 1.1 per cent in October, the thirteenth consecutive monthly fall since September 2000. Industrial output in October was 6.4 per cent lower than in the same month a year earlier. In Japan, partial indicators released recently suggest that the economy may have contracted further after an annualised decline of 2.9 per cent in the June quarter. Japan's unemployment rate rose to a record 5.4 per cent in October 2001.

As a result of weakening world economic activity, there have been significant move-



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ments in commodity prices on world markets. For example, spot prices (denominated in US dollars) for metals on the London Metal Exchange (LME) declined by around 10 per cent for copper, zinc and aluminium and 20 per cent for nickel after the September terrorist attacks, before a partial recovery in late November. Weaker prices have also been observed in world energy markets, with crude oil prices in US dollar terms falling by around 25 per cent since early September.

In agriculture, the movements in world indicator prices were mixed over the same period. While prices for most grains have been holding up, movements in prices of many livestock products and industrial crops have been substantial. For example, world indicator prices have declined by around 13 per cent for wool and 10 per cent for cotton and sugar since the September terrorist attacks. Following the discovery of bovine spongiform encephalopathy (BSE or 'mad cow' disease) in Japan, the Australian saleyard indicator price for cattle fell by around 10 per cent in October, before a recovery in November.

Prospects for commodity prices are crucial to commodity producers and exporters. Sharply lower commodity prices, if sustained, would result in significantly lower export revenues and returns to commodity producers.

Will the world economic slowdown be protracted?

Strong world economic growth is the key for sustained recovery in world commodity prices. A major issue for commodity producers and exporters is how severe will be the current world economic slowdown and how long will it take for the world economy to begin to recover?

There are a number of reasons to suggest that the current world economic slowdown may not be protracted and economic growth could begin to recover some time in the latter part of 2002.

First, since the September terrorist attacks, governments in many world economies have significantly loosened policy settings to stimulate economic activity. In the United States, for example, the federal funds rate was reduced to 2.0 per cent in November,

Key macroeconomic assumptions

<i>World</i>	Unit	1999	2000	2001 f	2002 f
Economic growth					
OECD	%	3.0	3.5	1.0	0.7
United States	%	4.1	4.1	1.0	0.5
Japan	%	0.8	1.5	-1.2	-1.0
Western Europe	%	2.2	3.3	1.7	1.3
Germany	%	1.8	3.0	0.7	0.8
France	%	3.0	3.4	1.9	1.3
United Kingdom	%	2.3	3.1	2.2	1.8
Italy	%	1.6	2.9	1.8	1.1
Korea, Rep. of	%	10.9	8.8	1.5	2.5
New Zealand	%	3.8	3.7	2.5	2.3
Developing countries	%	3.8	5.7	3.0	3.5
Non-OECD Asia	%	6.0	6.7	4.2	4.8
South East Asia a	%	3.7	6.0	1.0	2.1
China b	%	7.1	8.0	7.3	7.0
Chinese Taipei	%	5.4	6.0	-2.0	2.0
India	%	6.4	5.2	4.8	5.0
Latin America	%	0.2	4.2	0.7	1.5
Russian Federation	%	5.4	8.3	2.0	2.5
Ukraine	%	-0.2	5.8	1.5	2.0
Eastern Europe	%	2.0	3.8	1.5	2.3
World c	%	3.3	4.5	1.8	1.9
Industrial production					
OECD	%	3.0	4.9	-2.2	-0.4
Inflation					
United States	%	2.2	3.4	3.0	1.8
Interest rates					
US prime rate d	%	8.0	9.2	6.9	4.8
US exchange rates e					
Yen/US\$		114	108	121	124
Euro/US\$		0.94	1.08	1.12	1.10
		1998	1999	2000	2001
<i>Australia</i>		-99	-2000	-01 p	-02 f
Economic growth	%	5.3	4.3	1.8	3.0
Inflation	%	1.2	2.4	6.0	2.5
Interest rates g	%	8.0	8.4	9.2	8.0
Australian exchange rates					
US\$/A\$		0.63	0.63	0.54	0.51
Yen/A\$		77.1	67.8	61.5	62.4
TWI for A\$ h		56	55	50	50

a Indonesia, Malaysia, the Philippines, Singapore and Thailand. b Excludes Hong Kong. c Weighted using 2000 purchasing-power-parity (PPP) valuation of country GDPs by the IMF. d Commercial bank prime lending rates in the United States. e Average of daily rates. g Prime lending rates to large businesses. h Base: May 1970 = 100. f ABARE assumptions.

Sources: ABARE; ABS; IMF; OECD; RBA.

compared with 6.5 per cent at the end of 2000. The total fiscal stimulus now passed or being considered by US Congress is close to US\$150 billion, or equivalent to around 1.5 per cent of gross domestic product. In Japan, the authorities have increased liquidity in the money market, reduced the official discount rate and introduced a supplementary budget for Japanese fiscal year 2001-02 (April-March). In western Europe and other parts of Asia, expansionary policy settings have also been adopted in recent months.

Second, in contrast to the experience in previous world economic downturns, oil prices have fallen markedly since early September. Lower oil prices, if sustained, are expected to increase the purchasing power of consumers, reduce costs of production and moderate inflationary pressures. Lower inflationary pressures would provide more scope for further policy stimulus, if necessary, than would otherwise have been the case.

Third, the significant increase in monetary and fiscal stimulus in the major world economies appears to have helped to restore confidence in financial markets. Stockmarkets in the major world economies have regained values achieved before the September events, thus minimising the adverse impact on economic activity of 'wealth effects'.

While some upturn in world economic activity is assumed to be evident in the latter part of 2002, world economic growth for the year as a whole is likely to remain relatively

weak. In preparing the current set of commodity forecasts, world economic growth is assumed to be 1.9 per cent in 2002, compared with an estimated 1.8 per cent in 2001 and 4.5 per cent in 2000.

Despite indications that the economic downturn will not be protracted, there remains considerable uncertainty surrounding the current world economic outlook. This is because the full economic consequences of the terrorist attacks remain dependent on events that are still unfolding. There is a distinct possibility that the adverse impact on world economic growth, especially in the United States, could be more severe than currently expected.

The most worrying aspect of the current world economic slowdown is that it is more synchronised around the world than any of the previous downturns. If the economic slowdown in the United States proves to be more protracted than currently expected, the adverse effects on its major trading partners, especially those in Asia and western Europe, are likely to be substantial. As a result, world economic growth would be markedly weaker than currently assumed.

OECD economic growth

In the short term, the prospects for economic growth in the OECD region remain dependent on developments in the United States. Over the past year, significantly weaker economic growth in the United States has adversely affected economic activity in other OECD countries.

Economic growth in the OECD region is assumed to be 0.7 per cent in 2002. This compares with an estimated 1.0 per cent in 2001 and 3.5 per cent in 2000.

US economic recession a possibility

The September terrorist attacks on the United States happened at a fragile moment for the world's largest economy. Before the terrorist attacks, the pace of expansion in the economy was already slowing significantly. The terrorist attacks have further weakened US consumer and business confidence.

The US economy is estimated to have contracted by a seasonally adjusted annual rate of 1.1 per cent in the September quarter 2001, following growth of 0.3 per cent in the



June quarter and 1.3 per cent in the March quarter. The major contributors to the economic contraction in the third quarter were declines in exports, nonresidential fixed investment spending and inventories. The adverse effects were partially offset by increases in private consumption expenditure and government spending. Imports also fell sharply in the quarter.

Recent partial indicators suggest that the US economy is likely to have already fallen into a recession (commonly defined as two consecutive quarters of declining gross domestic product). Although retail sales increased in October, supported by a sharp rise of automobile sales as a result of zero interest rate financing provided by car manufacturers, growth in private consumption expenditure as a whole is likely to have weakened as consumer confidence has been shaken by the terrorist attacks. The index of consumer sentiment, for example, declined by a further 4 per cent in November, after a large monthly fall of around 12 per cent in October, to the lowest since early 1994.

Manufacturing activity, which has been hard hit by the economic slowdown, continues to contract. Since early 2001, the manufacturing sector has experienced large job cuts as factories reduce production to ease inventory pressures. Industrial production declined year on year by 4.9 per cent in the four months to October 2001. The unemployment rate increased to 5.4 per cent in October from around 4 per cent in late 2000. Besides manufacturing, large job cuts have also been reported in the services sector.

Associated with weakening domestic demand, the trade deficit fell to around US\$19 billion in September 2001 from a high of around US\$34 billion in early 2000. The improvement in trade performance mainly reflects a significant decline in imports. Exports declined in the month to the lowest since March 1999, due partly to the continued strength in the US dollar against other major international currencies.

In response to the weakening of economic activity, the US administration has adopted an expansionary stance on fiscal policy. Tax cuts, equivalent to around 0.6 per cent of gross domestic product, were already in place for 2002 before the September terrorist attacks. Further fiscal stimulus of close to

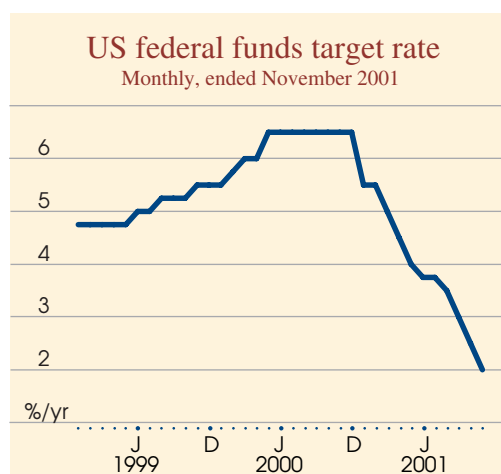
1 per cent of gross domestic product is being considered by Congress. In addition to extra defence and security spending and emergency disaster relief already approved, there are now requests for more monetary and fiscal stimulus to boost economic growth.

Similarly, monetary policy has been significantly relaxed. Before the terrorist attacks in September, the federal funds rate was already progressively lowered from 6.5 per cent at the beginning of 2001 to 3.5 per cent in early September. After the September terrorist attacks, it was further reduced to 2.0 per cent in November, the lowest in almost forty years.

The aggressive monetary and fiscal easing is likely to provide support for a revival of economic activity in the latter part of 2002. However, on year average terms, economic growth in 2002 is expected to be the weakest since 1992.

In preparing this set of commodity forecasts, economic growth in the United States is assumed to average around 0.5 per cent in 2002. This compares with an estimated 1.0 per cent in 2001 and 4.1 per cent in 2000.

There are uncertainties surrounding the US economic outlook. The main downside risks are associated with declining consumer and business confidence as a result of rising unemployment, declining business profits and possible continued bioterror attacks — the anthrax scares. Given these developments, there is a possibility that fiscal stimulus and lower interest rates could be less effective in reviving economic growth than in the past.



When consumer and business confidence is low, tax cuts tend to be saved rather than spent and lower interest rates are less likely to spur new investment or borrowing. Under this scenario, economic growth in the United States would be significantly weaker than currently assumed. Sharply weaker economic activity in the United States would also affect economic activity in other parts of the world.

Economic downturn in Japan

Over the past few months, the economic outlook for Japan has weakened significantly. Japan's economy was in contraction even before the September terrorist attacks in the United States. There are now indications that consumer and business sentiment has weakened and that the economic weakness is likely to continue in the short term.

Japan's economy is estimated to have contracted by 0.7 per cent in the June quarter 2001. The economic decline was caused mainly by falling private investment spending and lower net exports. The effects were partially offset by increases in private consumption expenditure and residential investment spending.

Partial indicators released recently suggest that economic activity in Japan may have contracted further. For example, industrial production declined by 2.9 per cent in September 2001, and was around 13 per cent lower than a year earlier. Workers' household spending, in real terms, fell year on year by 1.3 per cent in September, the sixth

consecutive monthly decline. Spending on overseas holidays has been adversely affected by the terrorist attacks in the United States, falling year on year by 27 per cent in the same month. Following the discovery in September of BSE in the domestic herd, Japanese consumers substantially cut spending on beef products.

Because of the worsening external environment, Japan's merchandise trade surplus declined year on year by 43 per cent in September. Export performance, which has been the main contributor to economic growth over the past few years, weakened year on year by 11 per cent in the month, while imports fell by 8.3 per cent compared with a year earlier.

Looking forward, economic activity in Japan is likely to continue to contract. In response, Japan's government introduced, in mid-November, a supplementary budget for Japanese fiscal year 2001-02 of 3 trillion yen (or equivalent to around 0.6 per cent of Japan's gross domestic product). In late November, the Japanese government further announced its intention to implement a second supplementary budget of 2.5 trillion yen, equivalent to an additional 0.5 per cent of gross domestic product, to support the economy.

In preparing this set of commodity forecasts, Japan's economy is assumed to decline by 1.0 per cent in 2002, following an estimated contraction of 1.2 per cent in 2001. This compares with growth of 1.5 per cent in 2000.





The main risks to the economic outlook in Japan stem from the Japanese government's attempt to reform the economy. Structural reform is essential to the prospects of economic recovery in Japan. The reform process, however, has the potential to significantly deepen Japan's economic weakness in the short term, before achieving greater economic benefits over the medium and longer term.

For example, the government's proposals to clean up nonperforming loans in the corporate and banking sectors, reduce public work projects and privatise semigovernment businesses have the potential to significantly increase business insolvencies, intensify deflationary pressures and raise unemployment in the economy.

However, a delay or slowdown of the urgently needed reforms could further worsen the structural problems that are slowly strangling Japan's economy. For example, the bad debt problem afflicting the banking and corporate sectors could worsen significantly in a contracting economic environment. Since the early 1990s, nonperforming loans have escalated from around 10–20 per cent of Japan's gross domestic product to the present level estimated at around 30–40 per cent. It will be a formidable challenge for Japan's government to strike the balance between short term implications and medium term requirements of structural reform in this difficult economic environment.

Besides uncertainty associated with economic restructuring, another predomi-

nant risk relates to the effect on Japan's economy of sharply weaker economic growth in the United States and other parts of Asia. The current world economic slowdown is having a significant effect on Japan's export performance, as well as on business and consumer sentiment. The deeper and longer the current world economic weakness, the more severe the effect on economic activity in Japan.

Growth weakening in western Europe

Economic conditions in western Europe have weakened over the past few months. Export industries have been hit hard by the global economic slowdown. Domestic demand has weakened in the wake of rising unemployment and a decline of consumer and business confidence, partly as a result of the September terrorist attacks on the United States.

In the largest regional economy, Germany, domestic demand is weak, despite income tax cuts at the start of the year. Large job cuts announced in the manufacturing and financial sectors have led to higher unemployment. The economy is estimated to have grown year on year by 0.3 per cent in the September quarter 2001, compared with growth of 0.6 per cent in the June quarter and 1.6 per cent in the March quarter.

Looking forward, economic activity in Germany is likely to remain weak in early 2002, before a revival in the latter part of the year. Although oil prices have fallen markedly, domestic demand is expected to remain subdued as a result of lower consumer confidence and rising unemployment. Economic growth in Germany is assumed to be 0.8 per cent in 2002, compared with an estimated 0.7 per cent in 2001 and growth of 3.0 per cent in 2000.

In France, economic growth is slowing from the relatively high rate achieved in 2000. In response, the French government recently announced a stimulus plan to counter the economic slowdown.

Economic growth in France is assumed to be 1.3 per cent in 2002, compared with an estimated 1.9 per cent in 2001 and 3.4 per cent in 2000.

In contrast to weakening economic growth in other parts of western Europe, The United Kingdom's economy grew at a

faster rate in the September quarter 2001. The economy is estimated to have expanded by 0.6 per cent in the quarter, after growth of 0.4 per cent in the June quarter. A healthy service sector has maintained the growth momentum in the economy, although manufacturing has suffered significantly from weaker demand.

Looking forward, it is inevitable that economic growth in the United Kingdom will be adversely affected by the global economic slowdown. Growth in the economy is assumed to slow to 1.8 per cent in 2002 from an estimated 2.2 per cent in 2001. This compares with growth of 3.1 per cent in 2000.

Over the past year, the European Central Bank has been less aggressive in relaxing monetary policy for the euro zone because of its mandate to contain inflation in the region to below 2 per cent. Since the September terrorist attacks, the European Central Bank has lowered its referencing rate from 4.0 per cent to 3.75 per cent in September and then to 3.25 per cent in November. As inflationary pressures continue to moderate in the region (with the annual rate declining to around 2.5 per cent in September 2001), the European Central Bank is likely to further lower its key interest rates in the short term.

For western Europe as a whole, economic growth is assumed to average 1.3 per cent in 2002, compared with an estimated 1.7 per cent in 2001 and 3.3 per cent in 2000.

Economic growth in developing countries

Economic growth in Asia

The terrorist attacks on the United States have markedly weakened the economic outlook for non-OECD Asia (which excludes Japan and the Republic of Korea). In addition to the impact on consumer and business confidence, significantly weaker US economic growth is expected to adversely affect the export performance of many Asian countries.

Economic growth in non-OECD Asia is assumed to be 4.8 per cent in 2002, compared with an estimated 4.2 per cent in 2001 and 6.7 per cent in 2000.

China's economy remains strong

Despite a significant weakening in the world economic outlook, the prospects for economic growth in China remain positive.

China's economic growth slowed marginally from an annual rate of 7.9 per cent in the first half of 2001 to 7.0 per cent in the September quarter. The easing of economic growth in the third quarter was due mainly to weaker growth in exports.

China is well placed to handle difficulties that may arise from the current world economic slowdown. Although export growth has eased (from 28 per cent in 2000 to around 7 per cent in the first nine months of 2001), domestic demand has been strong. Foreign direct investment remains robust, recording year on year growth of 21 per cent in the first nine months of 2001. This strong growth is likely to continue, given the strong performance of China's economy relative to its Asian neighbors.

Looking forward, it is inevitable that China's export performance will be adversely affected by the economic slowdown in its major trading partners, especially in the United States and Japan. The United States and Japan are the destinations for close to 40 per cent of China's exports.

Nevertheless, domestic demand is expected to remain strong. Industrial production, for example, increased year on year by 8.8 per cent in October 2001. In light of the significantly weaker exterior environment, China's government has pledged continued fiscal support for the domestic economy. Increases in government spending are therefore expected to limit the impact on domestic demand of weaker export growth.

Despite the relatively favorable outlook for China's economy as a whole, prospects are bleaker for the rural sector and in the western region of the country. Economic inequality between the eastern and western regions and between the rural and urban areas is likely to remain an important issue for economic management in China.

In addition, considerable reforms, especially in the banking sector and state owned enterprises, are required for high economic growth to be sustained. The entry of China into the World Trade Organisation is likely

to increase external competition for many industries, including agriculture, telecommunication, automobiles and financial services. While WTO membership is expected to bring significant benefits to China's economy over the medium to longer term, adjustments to its economic structure will be necessary to achieve these.

Economic growth in China is assumed to be 7.0 per cent in 2002, compared with an estimated 7.3 per cent in 2001 and 8.0 per cent in 2000.

Weaker economic performance in east and south east Asia

Reflecting the economic downturns in the United States and Japan, export oriented east and south east Asian economies have been adversely affected by weaker external demand. Given the subdued economic outlook for the OECD region, economic growth in east and south east Asia is expected to remain weak.

In the Republic of Korea, trade performance has weakened significantly with a year on year decline of 19 per cent in exports in October. Reflecting weaker domestic demand, imports fell by 18 per cent in the same month.

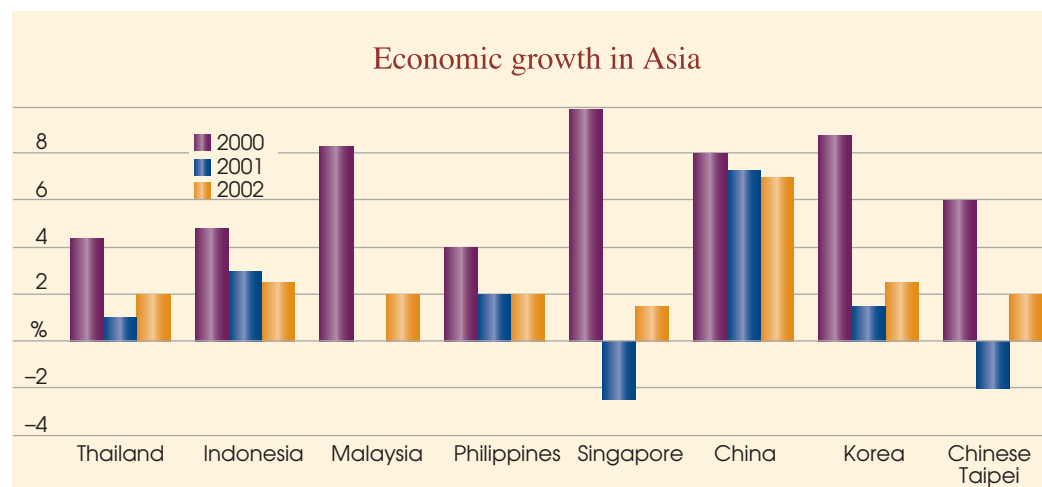
In response to the weakening economic outlook, Korea's government recently announced a second supplementary budget for 2001. Together with the first supplementary budget, the government has initiated additional fiscal spending equivalent to around 1.2 per cent of Korea's gross

domestic product. Economic growth in Korea is assumed to increase from an estimated 1.5 per cent in 2001 to 2.5 per cent in 2002, compared with 8.8 per cent in 2000.

In Chinese Taipei, the economy is estimated to have contracted year on year by 4.2 per cent in the September quarter 2001, following a decline of 2.4 per cent in the June quarter. Industrial production declined year on year by 15 per cent in September 2001 and the unemployment rate rose to a record 5.3 per cent. Export orders were down year on year by 27 per cent in the same month. Sharply weaker demand for semiconductors and other electronic products was the main contributing factor. The economy in Chinese Taipei is assumed to contract by 2.0 per cent in 2001, but then to grow by around 2.0 per cent in 2002. This compares with growth of 6.0 per cent in 2000.

In south east Asia, economic growth has been significantly affected by the global economic slowdown. In Malaysia, the economy is estimated to have declined year on year by 1.3 per cent in the September quarter 2001, compared with growth of 0.5 per cent in the June quarter. Manufacturing has been hammered by a slump in demand from the United States, the largest export market for Malaysia. Malaysia's economy is assumed to record no growth in 2001, before recovering to 2.0 per cent growth in 2002. This compares with growth of 8.3 per cent in 2000.

In Indonesia, the economy is estimated to have grown year on year by 2.4 per cent in



the September quarter 2001. Increases in private and government consumption expenditures are the main contributing factors. Despite this growth in general economic activity in the quarter, exports declined by 7.1 per cent and private investment spending fell by 7.6 per cent. Looking forward, export performance is likely to remain weak in the short term, given significantly lower economic growth in its major trading partners and sharply lower prices for petroleum products on world markets. Economic growth in Indonesia is assumed to be 2.5 per cent in 2002, compared with an estimated 3.0 per cent in 2001 and 4.8 per cent in 2000.

For south east Asia as a whole, economic growth is estimated to ease from 6.0 per cent in 2000 to 1.0 per cent in 2001. In 2002, economic growth in the region is assumed to be 2.1 per cent.

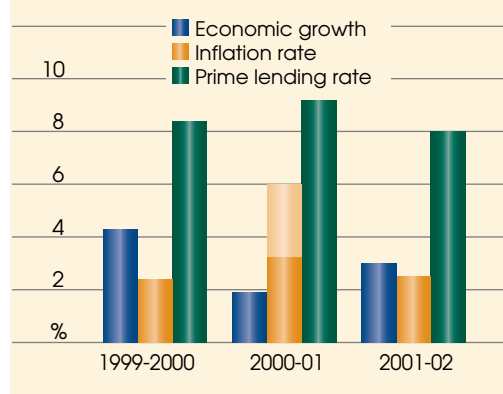
Economic prospects in Australia

Despite the weakening global economic environment, the economic outlook for Australia remains positive. The Australian economy grew seasonally adjusted by 1.1 per cent in the September quarter 2001, following growth of 1.2 per cent in the June quarter.

In the short term, economic growth in Australia is expected to remain relatively robust. Strong activity in the housing market is likely to continue, supported by lower mortgage rates and the grant for first home buyers. Building approvals, for example, rose year on year by 57 per cent in October 2001. Despite the terrorist attacks on the United States, consumer spending remains strong, with retail sales increasing year on year by 8.6 per cent in October 2001.

Nevertheless, weakening economic growth in Australia's major trading partners could adversely affect trade performance. While a seasonally adjusted surplus of \$2014 million was recorded for balance on goods and services in the September quarter 2001, lower prices and weaker demand in major international markets for Australian exports are likely to result in some easing of export growth in the short term.

Australian economic indicators



Economic growth in Australia is assumed to be around 3.0 per cent in 2001-02, compared with 1.8 per cent in 2000-01.

Inflationary pressures to remain modest

Australia's consumer price index rose by 0.3 per cent in the September quarter 2001, following an increase of 0.8 per cent in the June quarter (including the effects of the new tax system). Contributing most to the increase in the September quarter were rises in the cost of tobacco, motor vehicles, overseas holiday travel and accommodation. Partially offsetting these increases were falls in the cost of petrol and domestic holiday travel and accommodation.

Other price indexes released recently suggest that inflationary pressures are likely to remain modest. For example, the producer price index for final commodities fell to an annual rate of 2.7 per cent in the September quarter 2001 from 3.4 per cent in the previous quarter. Large falls in the prices of petroleum refining and electronic equipment contributed most to the decline in producer prices.

Australia's inflation rate is assumed to be 2.5 per cent in 2001-02. This compares with the headline inflation rate of 6.0 per cent in 2000-01 (including the effects of the new tax system).

Low prime lending rates

Australia's official interest rate was progressively reduced from 6.25 per cent in January to 4.75 per cent in early September. After the

terrorist attacks on the United States, the official interest rate was further reduced to 4.5 per cent in October and 4.25 per cent in early December. Australia's prime lending rate was 8.0 per cent in early December, compared with 9.8 per cent in early 2001.

The main factor affecting Australian interest rates is the outlook for economic growth and inflation. The outlook for Australia's economic growth is dependent on developments in the global economy. Given the weaker outlook for world economic growth and the prospect for modest inflationary pressures domestically, Australia's interest rates are expected to remain low. Australia's prime lending rates are assumed to average 8.0 per cent in 2001-02, compared with an average of 9.2 per cent in 2000-01.

Australian dollar assumed to average US51c in 2001-02

Following the terrorist attacks on the United States, the Australian exchange rate, both on a trade weighted basis and against the US dollar, depreciated markedly during late September and early October. Since mid-October, the Australian dollar has appreciated, supported partially by favorable interest rate differentials between Australia and its major trading partners.

The Australian dollar was trading around US52c and TWI 50 in early December. This compares with a recent low of US49c and TWI 47 in early October and US52c and TWI 49 in early September. The Australian dollar is estimated to average around US51c and TWI 50 in the first half of 2001-02.

In the short term, movements in the Australian dollar are likely to be influenced by prospects for economic recovery in the major world economies, especially in the United States, and hence by the outlook for Australia's export performance.

If, for example, there is a further weakening in the world economic outlook (and hence the outlook for world commodity prices), this could be interpreted unfavorably by financial markets and result in significant downward pressure on the Australian exchange rate.

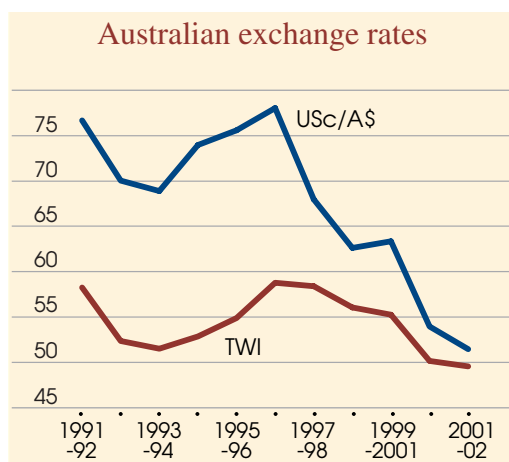
On the other hand, if the prospects for world economic growth improve over the remainder of 2001-02, the outlook for higher commodity prices on world markets and improved export performance should support an appreciation of the Australian dollar. A more favorable external environment for the Australian economy could also improve financial market sentiment toward the Australian currency.

Economic developments in Australia are also important in determining short term movements in the Australian dollar. Significant downward pressure on the Australian dollar could result if there were a weakening in economic prospects for Australia, including the outlook for economic growth, inflation and interest rates.

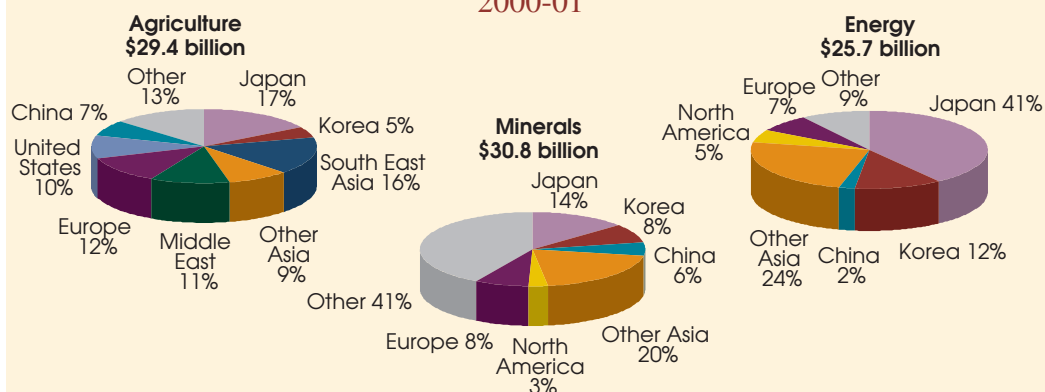
Reflecting the current weak world economic outlook, the Australian dollar is assumed to remain relatively weak in the short term. The Australian dollar is assumed to average around US51c and TWI 50 in 2001-02, compared with an average of US54c and TWI 50 in 2000-01.

Although the Australian dollar is assumed to remain relatively low, a major uncertainty about the direction of the Australian dollar in the short term is the strength of the US dollar.

Despite the sharp weakening of economic activity in the United States, the US dollar has remained strong against other major international currencies. In late November 2001, for example, the US dollar (on a trade weighted basis) was around 3 per cent higher than a year earlier and around 14 per cent higher than for the same period in 1999. The continued strength in the US dollar has weakened the competitiveness of the export and import competing industries in the



Markets for Australian commodity exports 2000-01



United States and is inconsistent with weak economic growth and lower interest rates in that country.

At the moment, financial markets seem to have overlooked the significance of the trade imbalance and weak economic growth in the United States. Consequently, there remains a possibility that financial market sentiment toward the US dollar could change rapidly in the short term, leading to a markedly weaker US dollar (and hence a stronger Australian dollar).

Australian exports

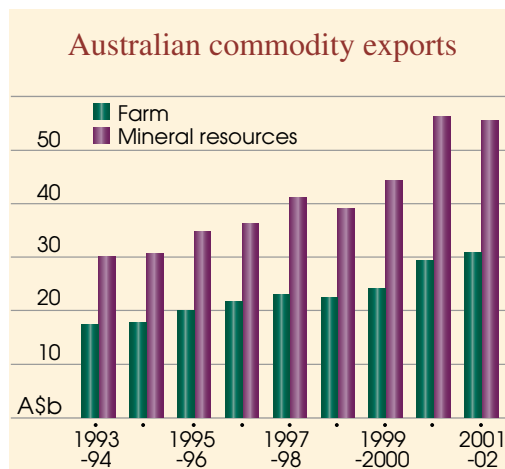
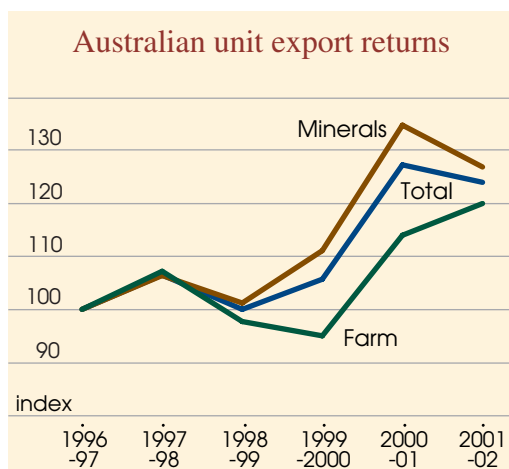
Unit export returns

Given the weaker world economic outlook, growth in demand for commodities is forecast to be more subdued in the short term.

Toward the latter part of 2002, however, the assumed world economic recovery and higher growth in industrial production are likely to result in stronger demand for Australian commodities on major world markets.

For the financial year 2001-02, unit export returns for Australian commodities are forecast to decline by 2.6 per cent. A competitive Australian exchange rate, especially against the US dollar, is expected to largely offset the adverse effects of lower commodity prices on world markets.

For farm commodities, the index of unit export returns is forecast to increase by 5.3 per cent in 2001-02, following a sharp rise of 20 per cent in 2000-01. In addition to the support of a relatively low Australian dollar, the forecast increase in unit export returns for farm commodities reflects a tighter



supply situation in major export markets. Because of relatively low global production and stocks, world indicator prices are forecast to average higher in 2001-02 for such farm commodities as wheat, corn, soybeans, beef and cheese.

For mineral resources commodities, unit export returns are forecast to fall by 5.9 per cent in 2001-02, compared with a significant rise of 21.3 per cent in the previous year. The forecast decline in world prices of mineral resources, in aggregate, is expected to more than offset the positive effect of a relatively weak Australian exchange rate. Unit returns

for energy exports are forecast to decline by 5.0 per cent in 2001-02, after a large rise of close to 27 per cent in 2000-01. Unit export returns for metallic minerals and metals are forecast to decline by 6.5 per cent in 2001-02, compared with an increase of 17 per cent in 2000-01.

Commodity export earnings

Reflecting a competitive Australian exchange rate and higher volumes shipped, the value of Australia's commodity exports is forecast to be \$90.5 billion in 2001-02, compared with \$89.8 billion in 2000-01.

Major indicators of Australia's commodities sector

		1996	1997	1998	1999	2000	2001	Change from previous year	
	Unit	-97	-98	-99	-2000	-01 p	-02 f	2000-01	2001-02
								%	%
Exchange rates									
US\$/A\$	US\$	0.78	0.68	0.63	0.63	0.54	0.51	- 14.3	- 5.6
Trade weighted index for A\$ a	index	59	58	56	55	50	50	- 9.1	0.0
Australian exports									
Unit returns b									
Farm	index	100.0	107.2	97.7	95.0	114.0	120.0	20.0	5.3
Forest and fisheries products	index	100.0	100.6	98.8	106.4	116.1	113.8	9.1	- 2.0
Total rural	index	100.0	106.5	97.9	96.2	114.3	119.3	18.8	4.4
Energy minerals	index	100.0	102.8	93.9	107.1	135.7	128.9	26.7	- 5.0
Metals and other minerals	index	100.0	109.0	106.3	113.8	133.1	124.4	17.0	- 6.5
Total mineral resources	index	100.0	106.4	101.2	111.1	134.8	126.9	21.3	- 5.9
Total commodities	index	100.0	106.5	100.0	105.7	127.3	124.0	20.4	- 2.6
Value of exports									
Farm	A\$m	21 870	23 090	22 571	24 154	29 400	30 929	21.7	5.2
Forest and fisheries products	A\$m	2 484	2 814	2 805	3 564	3 980	3 896	11.7	- 2.1
Total rural	A\$m	24 354	25 904	25 376	27 718	33 380	34 825	20.4	4.3
Energy minerals	A\$m	13 883	15 639	14 393	18 422	25 677	24 760	39.4	- 3.6
Metals and other minerals	A\$m	22 557	25 545	24 785	25 997	30 759	30 884	18.3	0.4
Total mineral resources	A\$m	36 441	41 184	39 178	44 419	56 435	55 645	27.1	- 1.4
Total commodities	A\$m	60 794	67 088	64 554	72 137	89 815	90 469	24.5	0.7
Australian production									
Volume of farm production b	index	98.7	100.0	106.0	109.9	110.4	109.7	0.5	- 0.6
Net value of farm production	A\$m	4 451	4 437	4 176	4 667	7 121	8 282	52.6	16.3
Volume of mine production b	index	93.4	100.0	95.8	106.8	113.9	115.1	6.6	1.1

a Base: May 1970 = 100. b Base: 1996-97 = 100. In this table the **unit return** indexes have been re-referenced from the base years used in the original data sources and in the statistics section of this publication. p Preliminary. f ABARE forecast.

Note: ABARE revised the method for calculating **production** indexes in October 1999. The indexes for the different groups of commodities are now calculated on a chained weight basis using Fishers' ideal index with a reference year of 1997-98 = 100.

Sources: Australian Bureau of Statistics; ABARE.

COMMODITY OVERVIEW

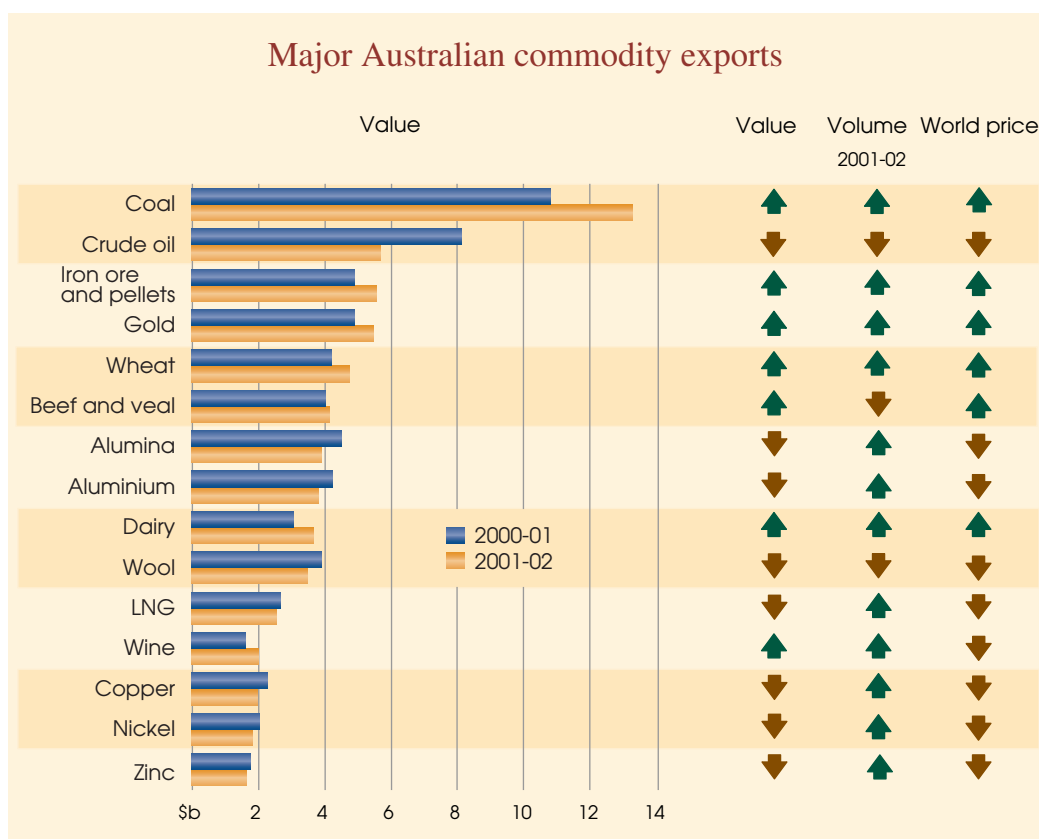
For farm commodities, export earnings are forecast to be \$30.9 billion in 2001-02, compared with \$29.4 billion in 2000-01. Agricultural commodities where export earnings are forecast to increase in 2001-02 include wheat, barley, rice, sugar, wine, beef and veal, lamb, live cattle, live sheep and dairy products. For forest and fisheries products, export earnings are forecast to be slightly under \$3.9 billion in 2001-02, around 2.1 per cent lower than in 2000-01.

The value of Australia's minerals and energy exports is forecast to be \$55.6 billion

in 2001-02, compared with \$56.4 billion in 2000-01.

For energy commodities, export earnings are forecast to decline to \$24.8 billion in 2001-02 from \$25.7 billion in 2000-01.

For metallic minerals and metals, export earnings are forecast to be \$30.9 billion in 2001-02, similar to that recorded in the previous year. Export earnings are forecast to increase for such mineral resources commodities as coal, gold, iron ore, lead and manganese in 2001-02.



Agriculture

Outlook to 2001-02



The net value of farm production is forecast to rise by 16 per cent to \$8.3 billion in 2001-02, with higher returns from beef, grain and dairy products expected to more than offset increases in farm costs.



The value of farm exports is forecast to rise by 5.2 per cent to \$30.9 billion in 2001-02, following a 22 per cent increase last year.



Total winter crop production is forecast to fall by around 6 per cent to 34.1 million tonnes, largely owing to a decline in the area sown to winter crops.



Farm incomes

Another strong performance in 2001-02

Continuing high levels of farm production and forecast further improvements in the prices for beef, wheat and dairy products indicate another strong financial performance for the Australian farm sector in 2001-02. The net value of farm production is forecast to rise by 16 per cent to \$8.3 billion in 2001-02, following a 53 per cent increase in 2000-01.

The bright outlook for farm incomes reflects generally favorable seasonal conditions and continuing strong growth in farm export earnings. Farmers continue to benefit from a weak Australian dollar, which is assumed to average US51c in 2001-02, compared with around US54c in the previous year.

Farm prices

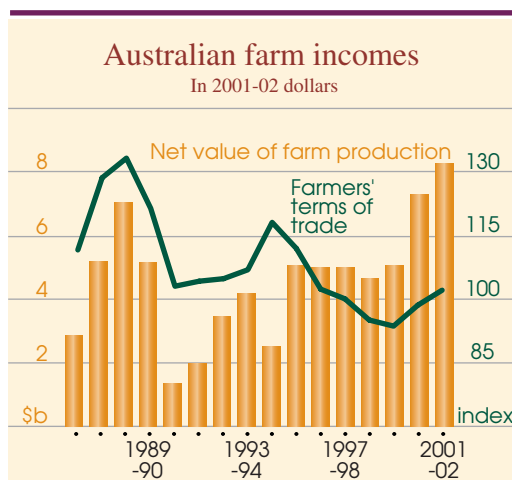
Prices to remain firm in 2001-02

The index of prices received by Australian farmers is forecast to rise by 5.4 per cent in 2001-02, on top of a 14 per cent improvement in 2000-01. The forecast increase in 2001-02 reflects a 7.5 per cent rise in the prices of livestock products and a 2.7 lift in average crop prices.

Australian cattle prices are expected to remain firm during the remainder of 2001-02, reflecting a weak Australian dollar and reduced turnoff, as producers continue to rebuild herds. The Australian saleyard indicator price for cattle is forecast to average 310 cents per kilogram in 2001-02, nearly 17 per cent higher than in the previous year.

Saleyard prices for prime lambs are forecast to rise by around 14 per cent to average 230 cents a kilogram in 2001-02, with lower domestic supply and strong US demand for lamb underpinning higher saleyard prices.

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The Australian eastern market indicator for wool is forecast to fall by just over 3 per cent in 2001-02 to average around 740 cents a kilogram, following a 22 per cent rise in 2000-01. Slower world economic growth is contributing to some easing in demand for wool in 2001-02, with a downturn in consumer spending in key wool consuming countries.

World cotton prices have fallen in recent months reflecting higher world production and sluggish demand. The cotlook A index is forecast to average around US44.6c/lb in 2001-02, down 24 per cent from the previous year.

Australian wheat prices are forecast to rise by A\$19 a tonne in 2001-02, with the

Major indicators of Australia's farm sector

		1996	1997	1998	1999	2000	2001	Change from previous year	
	Unit	-97	-98	-99	-2000	-01 p	-02 f	2000-01	2001-02
								%	%
Gross value of farm production a									
Crops	A\$m	16 170	15 452	16 015	16 743	18 032	18 231	7.7	1.1
Livestock	A\$m	12 089	12 916	12 664	13 344	16 234	17 568	21.7	8.2
Total	A\$m	28 259	28 367	28 679	30 088	34 266	35 799	13.9	4.5
Farm costs	A\$m	23 808	23 930	24 503	25 421	27 145	27 517	6.8	1.4
Net cash income b	A\$m	6 918	7 080	6 779	7 838	10 226	11 512	30.5	12.6
Net value of farm production c	A\$m	4 451	4 437	4 176	4 667	7 121	8 282	52.6	16.3
Value of farm exports (fob)									
Crops	A\$m	11 743	11 820	12 124	12 637	14 678	15 603	16.2	6.3
Livestock	A\$m	10 127	11 271	10 447	11 517	14 721	15 326	27.8	4.1
Total	A\$m	21 870	23 090	22 571	24 154	29 400	30 929	21.7	5.2
Farm price indexes									
Prices received by farmers	index	101.6	100.0	95.0	96.6	109.9	115.8	13.8	5.4
Prices paid by farmers	index	99.3	100.0	100.0	103.3	110.0	111.6	6.5	1.5
Farmers' terms of trade	index	102.3	100.0	95.0	93.6	99.9	103.8	6.7	3.9
Volume of farm production									
Crops	index	100.1	100.0	108.2	113.9	113.0	110.6	-0.8	-2.1
Livestock	index	96.5	100.0	103.3	105.2	107.2	108.1	1.9	0.8
Total farm	index	98.7	100.0	106.0	109.9	110.4	109.7	0.5	-0.6
Crop area and livestock numbers									
Crop area (grains and oilseeds)	'000 ha	19 366	18 900	20 422	20 592	22 172	19 368	7.7	-12.6
Sheep	million	120.2	117.5	115.5	115.7	113.3	111.4	-2.1	-1.7
Cattle	million	26.7	26.9	26.6	27.6	28.8	29.1	4.3	1.0

a For a definition of the gross value of farm production see table 23. b Gross value of farm production less increase in assets held by marketing authorities and less total cash costs. c Gross value of farm production less total farm costs. p Preliminary. f ABARE forecast.

Note: ABARE revised the method for calculating farm price indexes in October 1999. The indexes for the different groups of commodities are now calculated on a chained weight basis using Fishers' ideal index with a reference year of 1997-98 = 100.

Sources: Australian Bureau of Statistics; ABARE.

average pool return for Australian premium white forecast to be A\$250 a tonne. World wheat consumption is expected to exceed production for the fourth consecutive year, reflecting reduced production in key exporting countries.

Improved returns are expected for canola in 2001-02, with world canola production forecast to decline for the second year in a row. Prices to Australian farmers are forecast to average \$410 a tonne, around 23 per cent higher than in 2000-01.

Australian farm gate prices for milk are forecast to rise by over 7 per cent to average 30.2 cents a litre in 2001-02, as manufacturers continue to pass on the benefits of higher world prices for cheese and whole milk powder.

World sugar prices are forecast to fall by 18 per cent to average around US\$8.2c/lb in 2001-02, reflecting higher Brazilian production and sluggish world demand.

Farm production

The gross value of farm production is forecast to rise by 4.5 per cent to \$35.8 billion in 2001-02, with the increase driven largely by higher prices for key commodities.

Total winter crop production is forecast to be 34.1 million tonnes in 2001-02, around 6 per cent below last year's crop. The fall in production largely reflects a reduction in total area sown and poor seasonal conditions for most of the Queensland crop.

The area sown to summer crops is forecast to decline by 8 per cent to 1.6 million hectares in 2001-02, with the area sown to cotton estimated to be down by 23 per cent compared with last season.

Total meat production is forecast to be 3.7 million tonnes in 2001-02 — marginally lower than in the previous year — reflecting an expected decline in sheep and lamb slaughterings. Shorn wool production is forecast to fall slightly to 596 000 tonnes greasy in 2001-02, as the number of sheep shorn falls.

Farm costs

Total farm costs are forecast to increase by 1.4 per cent to \$27.5 billion in 2001-02, following a rise of just under 7 per cent in

2000-01. The large increase in farm costs during 2000-01 was driven mainly by steep rises in fuel prices associated with higher international prices for crude oil and a weak Australian dollar.

However, there has been a marked decline in international crude oil prices in recent months and this will flow through to lower fuel prices for Australian farmers in 2001-02. Farmers will also benefit from lower interest costs in 2001-02. Following recent falls in official rates, interest rates are assumed to average 1.2 percentage points lower than in 2000-01.

Farm exports

The farm sector continues to be a strong export earner in 2001-02. Total farm exports are forecast to rise by 5.2 per cent to \$30.9 billion in 2001-02 following a 22 per cent increase in 2000-01. Commodities for which forecast export growth is highest in 2001-02 are rice (up 51 per cent), canola (up 34 per cent), dairy products (up 20 per cent), wine (up 22 per cent) and wheat (up 14 per cent). In contrast, the value of cotton exports is forecast to fall by around 30 per cent in 2001-02, owing to reduced plantings and lower export prices.



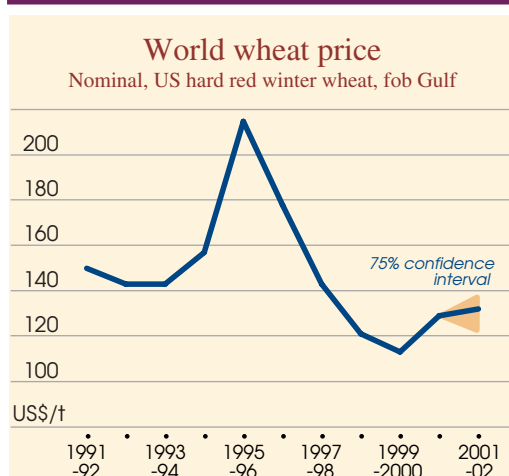
Grains

With world consumption of grains and oilseeds forecast to well outstrip production in 2001-02, there is expected to be a major rundown in carryover stocks by the end of the year.

While availabilities are adequate to meet market needs in 2001-02, the market will respond quickly to any reports of widespread crop failure or damage to next season's crops in the major producing countries.

Wheat

World wheat prices are forecast to rise on average by only 2.3 per cent in 2001-02 (July–June year) in spite of an estimated 11 per cent reduction in wheat production in major wheat exporters in the current season.



The world indicator wheat price (US hard red winter, fob Gulf) is forecast to average US\$132 a tonne in 2001-02, compared with US\$129 a tonne in 2000-01. Prices for the first five months of the marketing year have averaged US\$127 a tonne, but some seasonal improvement in prices is expected as the US harvest has been finalised and pressure on terminal storage space eases.

However, world wheat stocks will be run down significantly over 2001-02. Therefore, prices in the first half of 2002 will be sensitive to any adverse information about crop progress for 2002 season crops in the major northern hemisphere winter wheat producing countries, the United States and the European Union.

Weakening global economic growth prospects in 2001-02 are expected to have less of an impact on world wheat markets

than on world coarse grains markets. Nevertheless, if the impacts are more serious than currently expected, demand for wheat, particularly in the Asia Pacific region, could slow as consumers in these countries turn toward lower priced local grain sources such as rice and maize.

Reflecting these uncertainties, there is an estimated 75 per cent probability that the final average indicator price of wheat in 2001-02 will be in the range US\$123-138 a tonne.

Wheat production falls in 2001-02

For the fourth consecutive season, world wheat production in 2001-02 is expected to fall. Production is forecast to be down by around 8 million tonnes from the previous season to 574 million tonnes, and to be well below the record production of 610 million tonnes in 1997-98.

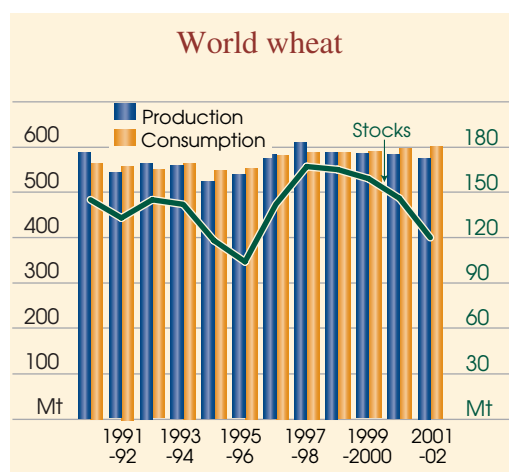
Among the major producers and exporters, significant falls have been recorded in the European Union (down 12 million tonnes from the previous season to 92 million tonnes), the United States (down 7 million tonnes to 53 million tonnes), China (down 6 million tonnes to 94 million tonnes) and India (down 7 million tonnes to 69 million tonnes).

Major recoveries in production have been recorded in eastern Europe, the Russian Federation and other former Soviet republics. Production in 2001-02 is estimated to be up in the Russian Federation by 10 million tonnes to 45 million tonnes, and to have doubled in the Ukraine from 10 million tonnes in 2000-01 to 20 million tonnes in 2001-02.

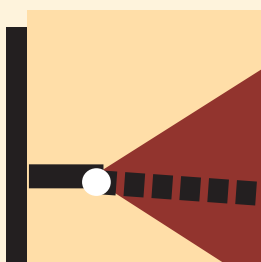
Limited growth in consumption in 2001-02

World wheat consumption in 2001-02 is forecast to increase by less than 1 per cent over the previous year, or by 5 million tonnes to a total of 600 million tonnes.

Adequate supplies of coarse grains and increased availabilities of soybeans in 2001-02 are expected to discourage increased use of wheat for feed in the major developed countries, particularly in the European Union. Reduced economic growth prospects in 2001-02 are also expected to limit consumption growth in developing countries.

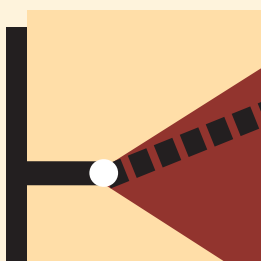


Confidence intervals



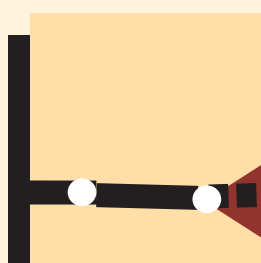
Q Why isn't the forecast always in the middle of the confidence interval?

A The statistical procedure ABARE uses to construct the confidence intervals does not rely on the assumption of 'normality'. Given this, the range of possible price outcomes will not be symmetrically distributed around the midpoint of a confidence interval — with the result that the point forecast will usually be above or below the midpoint.



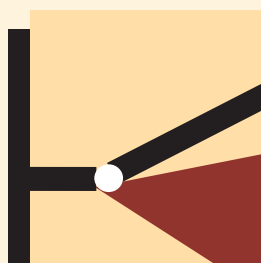
Q What does it mean when ABARE's point forecast is closer to the upper bound or the lower bound of the confidence interval?

A When the point forecast is closer to the upper bound of the confidence interval, there is expected to be more 'downside' risk (greater chance of the actual price being lower than the forecast) associated with ABARE's point forecast. When it is closer to the lower bound, there is more 'upside' risk associated with the point forecast.



Q Why do the confidence intervals for some commodity prices look wide when prices have been relatively stable in recent times?

A The confidence interval reflects the range in which price movements are likely to occur in the forecast period if some unexpected or unpredictable large events occur. Experience has demonstrated that relatively stable price movements in recent times do not necessarily mean that unpredictable major events will not re-occur in the near future.



Q Is it possible for actual prices to move outside the confidence intervals?

A Yes. The intervals graphed show the range in which the price has a 75 per cent chance of falling. Thus, there is a 25 per cent chance that the actual price could be outside this range.

For a technical explanation of confidence intervals, see Penm, J. and Neighbour, N. 1996, 'Confidence intervals for commodity prices', *Australian Commodities*, vol. 3, no. 3, pp. 310–11.

Pickup in trade

Global wheat trade is forecast to expand by around 5 million tonnes in 2001-02 to 105 million tonnes. Much of the growth is being picked up by 'second tier' exporters. Exports from the major exporters (the United States, Canada, the European Union, Australia and Argentina) are forecast to decline from 87 million tonnes in 2000-01 to 85 million tonnes, reflecting lower overall production in 2001-02.

Part of the forecast growth in trade reflects higher imports by the European Union. Increased availabilities from eastern European countries, particularly the Ukraine, and reduced domestic production in the European Union has resulted in increased imports of feed and lower quality milling wheats by major deficit regions in the southern parts of the European Union.

World stocks to fall

With world production in 2001-02 declining and consumption expected to continue to expand, world wheat stocks are forecast to decline by 18 per cent, or 26 million tonnes, to 120 million tonnes by the end of 2001-02. This would represent the lowest end of season global stocks since 1981-82.

Stocks held by the major exporters are forecast to decline by 14 million tonnes to 39 million tonnes by the end of 2001-02. This would be the lowest stocks in these countries since 1996-97.


The expected tighter supply-demand situation at the end of 2001-02 means that wheat prices in 2002 could be quite volatile if adverse growing conditions prevail in major northern hemisphere wheat producers in the first half of 2002.

Recovery in the Australian wheat crop in 2001-02

Planting of the 2001-02 wheat crop was delayed because of a lack of rainfall around sowing time, particularly in Western Australia and Queensland. However, many areas benefited from good spring rains and a mild finish to the season. Wheat production in 2001-02 is forecast to reach 22.0 million tonnes, 7 per cent below last season's Australian Bureau of Statistic's estimate of production.

Because of the poor start to many crops, crop yields have been variable. Crops in Queensland, the western margins of the New South wheat belt and the eastern regions in Western Australia have not recovered from the dry start. Above average yields are being recorded in many parts of South Australia, Victoria and in the southerly regions of Western Australia, while other crops in south east Australia suffered frost damage in late October.

After a dry start to the season in northern New South Wales, good spring rains and mild temperatures encouraged crop growth although grain protein levels have been relatively low. However, late season rains in the

		1998	1999	2000	2001	% change	Wheat
Unit		-99	-2000	-01 p	-02 f		
World							World wheat prices could increase sharply in 2002 if there are major crop shortfalls in the northern hemisphere
Production	Mt	589	586	582	574	-1.4	
Consumption	Mt	588	590	595	600	0.8	
Closing stocks	Mt	165	159	146	120	-17.8	
Trade	Mt	99	109	100	105	5.0	
Price	US\$/t	119	113	129	132	2.3	 After a dry start to the season, much of the Australian wheat crop has benefited from spring rains and mild conditions, but production is still forecast to fall
Australia							
Area	'000 ha	11 543	12 168	13 002	11 176	-14.0	
Production	kt	21 464	24 758	23 765	22 070	-7.1	
Exports	kt	16 384	17 274	16 570	17 500	5.6	
- value	A\$m	3 467	3 481	4 197	4 762	13.5	
APW pool return	A\$/t	190	192	231	250	8.2	
See back tables for more details. p Preliminary, f ABARE forecast.							Contact: Peter Connell +61 2 6272 2042

See back tables for more details. p Preliminary. f ABARE forecast.

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second half of November as the harvest was under way caused crop losses and quality downgrading of grain in some crops.

Australian exports up slightly

Reduced export availabilities in the European Union and lower supplies of white wheat from the United States are likely to result in increased export opportunities in Middle East and south east Asian markets. Exports of Australian wheat in 2001-02 (July-June) are forecast to increase by around 1 million tonnes to 17.5 million tonnes. Reflecting movements in the Australian US dollar exchange rate and a slight improvement in world wheat prices, unit export returns are forecast to increase by 7 per cent to average around \$272 a tonne in 2001-02.

The average pool return for Australian premium white wheat is forecast to be \$250 a tonne, some \$19 a tonne higher than in 2000-01. Movements in exchange rates explain part of the improvement in pool returns; measured in US dollar terms, the pool price for Australian premium white wheat is forecast to increase from around US\$125 a tonne in 2001-01 to US\$129 a tonne in 2001-02.

Coarse grains

World coarse grains prices are forecast to increase slightly in 2001-02 in response to an expected fall in world stocks. The world coarse grains indicator price (US corn, fob Gulf basis) is forecast to increase by 2 per cent to average around US\$92 a tonne in 2001-02 (October-September) — only a marginal improvement on the relatively low prices of the past couple of years.

Global coarse grains stocks are forecast to decline by around 23 million tonnes to 165 million tonnes in 2001-02 as the growth in world consumption exceeds that in production.

World barley prices are forecast to remain firm in 2001-02 driven by strong demand for malting barley and lower estimated supplies in the traditional exporting countries. Australian barley prices are forecast to average around \$202 a tonne in 2001-02, around \$6 higher than in the previous year. For malting barley, prices are forecast to average

\$234 a tonne, with feed barley averaging \$186 a tonne in 2001-02.

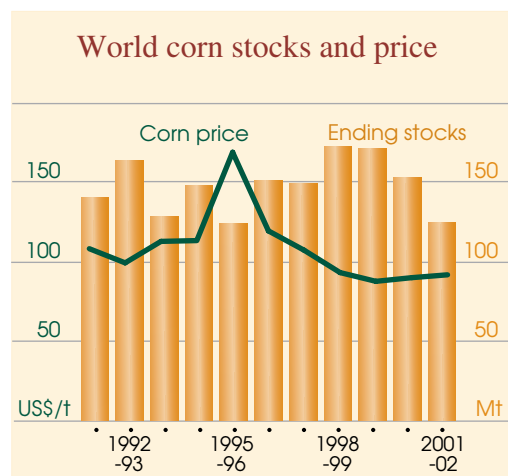
Higher world production

World coarse grains production is forecast to increase to 872 million tonnes in 2001-02. Lower estimated coarse grains production in north America, the European Union and Argentina is expected to be more than offset by higher output in eastern Europe, the Russian Federation and China.

In the United States, coarse grains production in 2001-02 is estimated to decline by 4 per cent to 263 million tonnes. Timely rains during the latter part of the growing season resulted in corn yields being somewhat better than earlier anticipated. Despite this, corn yields are estimated to be lower than in the previous season. When the lower yields are combined with reduced plantings, US corn production is estimated to be 242 million tonnes — around 11 million tonnes lower than in the previous year. Both barley and oats production are significantly lower than last year.

Coarse grains production in Canada is estimated to decline by around 10 per cent to 24 million tonnes in 2001-02. Dry conditions in southern Alberta and Saskatchewan resulted in barley production falling by around 18 per cent to 11.1 million tonnes.

In the European Union coarse grains production in 2001-02 is estimated to be similar to that last year. Lower barley production, which is estimated to fall by 3 million tonnes to 48.6 million tonnes, has been offset by higher corn production.



Despite dry conditions having been experienced in most growing regions of north east China, corn production is estimated to increase marginally to 108 million tonnes in 2001-02, well below the 128 million tonnes recorded in 1999-2000. Elsewhere in Asia coarse grains production is estimated to remain relatively unchanged in 2001-02.

Reflecting much improved seasonal conditions, coarse grains production in eastern Europe is estimated to increase by around 40 per cent to 52 million tonnes in 2001-02, with particularly large increases in Hungary and Romania.

Coarse grains production in the Russian Federation and Ukraine is also higher in response to favorable seasonal conditions and better supplies of fuel and fertiliser.

World consumption to expand

World consumption of coarse grains is forecast to rise by nearly 2 per cent to 895 million tonnes in 2001-02. Subdued world economic growth through the remainder of 2001-02 is expected to temper the demand for livestock products, hence moderating the expected increase in coarse grains consumption.

In China, despite higher domestic corn prices, feed grain use is forecast to increase by around 4 per cent because of higher pig and poultry production.

Consumption of coarse grains in south east Asia is also expected to rise, but to be tempered by a slowdown in the demand for livestock products.

In the United States feed grain consumption is forecast to decline by 3 million tonnes to 158 million tonnes in 2001-02, reflecting an expected fall in the number of cattle on feed and lower dairy cattle numbers. However, corn used in the manufacture of fuel ethanol is forecast to increase by 11 per cent as new plants are brought into production to meet the increased demand for ethanol.


Trade remains subdued

World trade in coarse grains is expected to remain subdued in 2001-02 as some of the largest importers reduce their import of feed grains.

Japan, which accounts for 17 per cent of world coarse grains imports, is forecast to reduce its use of feed grains in 2001-02 because of an expected smaller cattle herd. The confirmation of BSE (bovine spongiform encephalopathy or 'mad cow' disease) in the cattle herd has adversely affected beef consumption and is expected to accelerate the trend of lower beef production (as discussed later in the meat section).

Domestic meat production in the Republic of Korea is expected to continue to decline and consequently the demand for feed grain imports is forecast to fall.

World barley trade is forecast to decline slightly in 2001-02 as exports from the European Union, Canada and the United States fall. In the European Union strong domestic demand and lower production are

		1998	1999	2000	2001	% change	Coarse grains
	Unit	-99	-2000	-01 p	-02 f		
World							<i>A tighter supply-demand situation is expected to lead to a slight increase in prices in 2001-02</i>
Production	Mt	889	876	857	872	1.8	
Consumption	Mt	870	882	879	895	1.8	
Closing stocks	Mt	215	210	188	165	- 12.2	
US corn price (fob Gulf, Oct-Sept)	US\$/t	93	88	90	92	2.2	
Australia							 <i>Favorable planting conditions in northern New South Wales and Queensland are expected to result in a large area being sown to summer crops in 2001-02</i>
Area	'000 ha	5 115	4 245	5 544	5 137	- 7.3	
Production	Mt	10.7	9.4	11.4	11.2	- 1.8	
Exports	Mt	5.2	4.5	4.7	5.1	8.5	
- value	A\$m	960	931	1 173	1 339	14.2	
Barley price (composite of feed and malting prices)	A\$/t	140	172	196	202	3.1	
See back tables for more details. p Preliminary. f ABARE forecast.							Contact: David Barrett +61 2 6272 2198

likely to limit subsidised EU exports in 2001-02. Furthermore, substantially lower north American barley production is expected to limit exports from that region.

Partly offsetting the EU and north American situation, during the first half of 2001-02 feed barley from eastern Europe was competitively traded on the world market, reflecting increased availability in those countries.

Increased summer crop production in Australia

Good soil moisture levels at planting and relatively firm feed prices are expected to result in farmers sowing a relatively large sorghum crop. The area sown in 2001-02 is forecast to reach around 793 000 hectares and, given average seasonal conditions, sorghum production is forecast to reach a record 2.2 million tonnes, 4 per cent higher than the relatively large crop of the previous year.

In central and south east Queensland, many grain producers were unable to harvest a winter crop, but good rainfall in the south east of the state in November is likely to ensure a significant area will be sown to summer crops in 2001-02. The areas sown to both sorghum and maize are forecast to increase by 5 per cent and 20 per cent respectively.

Barley production in 2001-02 is forecast to reach 6.8 million tonnes, 6 per cent less than the estimate for the previous year. The area sown to barley is estimated to have been lower in all the major growing states in 2001-02. Cool mild conditions across south eastern Australia led to an excellent finish to the barley crop, with the proportion of malting barley expected to be relatively high. Apart from the south western region of Queensland, the production of winter coarse grains in Queensland has been adversely affected by very dry conditions through the central and southern regions.

There is expected to be some easing in domestic demand for feed grains in the second half of 2001-02 as a result of forecast lower numbers of cattle on feed. However, partly offsetting the weakening of demand from cattle feeders will be further growth in demand from pig and poultry producers as they expand output. Overall, domestic feed

grain use is expected to remain relatively high through the remainder of 2001-02.

Oilseeds

With a record world oilseeds crop expected to be harvested in 2001-02 (October–September), the world indicator oilseed price (US soybeans cif Rotterdam) is forecast to fall by over 5 per cent to US\$190 a tonne in 2001-02.

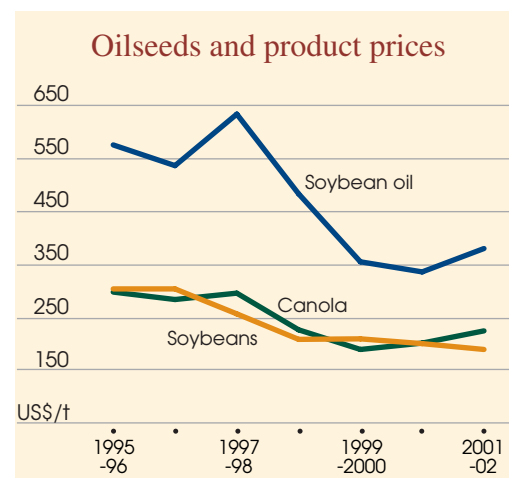
World oilseeds production to increase

A record world oilseeds crop of 323 million tonnes is forecast to be harvested in 2001-02, up 12 million tonnes from last season. The increase largely reflects the increase in world soybean production. All three of the major producers, the United States, Brazil and Argentina, are expected to harvest record crops in 2001-02.

Soybean production in the three major producers is forecast to increase from 140 million tonnes to 149 million tonnes in 2001-02. US producers have just completed a record 80 million tonnes harvest in 2001-02, despite dry conditions in the main producing states. Recent wet weather in Argentina has stalled the planting of maize and sunflowerseed crops and may well result in some switching of crop areas to soybeans.

Reduced canola and sunflower production

While a record soybean crop is expected to be harvested in 2001-02, world production of the 'oil rich' oilseeds, canola and sunflower-



erseed, is forecast to decline for the second year in a row in 2001-02.

Dry weather in most of the major canola producing countries, the European Union, Canada and Australia, has contributed to an expected 1 million tonne decline in world canola production to 36 million tonnes in 2001-02. This figure is well below the record 42 million tonne harvest in 1999-2000.

Unfavorable weather conditions in major producing countries, the Russian Federation and the Ukraine, eastern Europe and France have reduced sunflower production, with production declining to 21 million tonnes, again well below the record harvest of 27 million tonnes in 1999-2000.

Markets more dependent on soybeans

The expected decline in world production of canola and sunflowerseed will result in the market being increasingly dependent on soybeans, particularly in meeting demand for vegetable oil. Soybeans yield less oil when crushed (less than 20 per cent) than sunflowerseed and canola (both over 40 per cent).

In addition, little growth is expected in palm oil production in 2001-02. Production in Malaysia, the major exporter supplying over 60 per cent of world trade, is forecast to rise by only 2 per cent, or 0.3 million tonnes, in 2001-02 compared with an average production growth of over 6 per cent a year over the past five years.

Allowing for a modest growth in the use of vegetable oils in 2001-02 of 3 per cent, compared with the average growth in oil consumption of just under 5 per cent over the previous five years, the overall requirements for oilseeds for crushing to meet the demand for vegetable oils is forecast to increase.

However, the expanded use of soybeans for vegetable oil production will increase overall oilmeal availabilities during 2001-02. Economic growth indicators have deteriorated in recent months in many of the developed countries that are major oilmeal markets. The economic slowdown is likely to have an adverse effect on the demand for food products such as meat and other live-stock products. Thus the overall growth in world demand for oilmeals is likely to be relatively weak in 2001-02.

Overall, while world vegetable oil prices are likely to strengthen during 2001-02, world oilmeal prices are forecast to move in line with oilseed prices and average lower than in 2000-01.

Reduced Australian production

Australian canola production is forecast to decline by 19 per cent to 1.55 million tonnes in 2001-02.

As a result of poor prices last year, growers in Western Australia, Australia's main producing state, reduced plantings by around 30 per cent. While the majority of the

	Unit	1998 -99	1999 -2000	2000 -01 p	2001 -02 f	% change	
World							Oilseeds
Production	Mt	295	303	311	323	3.9	<i>With a record world oilseeds crop to be harvested in 2001-02, world oilseeds prices are forecast to ease</i>
Consumption	Mt	293	301	312	322	3.2	
Closing stocks	Mt	19.5	21.8	19.8	21.0	6.1	
Soybeans indicator price	US\$/t	210	210	201	190	-5.5	
Australia							<i>Australian canola production is forecast to decline in 2001-02 but prices to growers are forecast to increase</i>
Total production	kt	3 092	3 810	3 176	2 650	-16.6	
- winter	kt	1 724	2 467	1 947	1 582	-18.7	
- summer	kt	1 368	1 343	1 228	1 068	-13.0	
Canola							
Production	kt	1 690	2 426	1 905	1 545	-18.9	
Exports (Nov-Oct)	kt	1 355	2 033	1 296	1 201	-7.3	
Price (Nov-Oct) (delivered Melbourne)	A\$/t	344	288	333	410	23.1	

See back tables for more details. p Preliminary. f ABARE forecast.

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state's plantings were confined to the higher rainfall areas, relatively dry conditions through much of the growing period means average yields are forecast to be below the long term average.

Canola production in eastern Australia is also forecast to decline as a result of the dry winter. Good spring rains and mild conditions have benefited many crops and average yields are forecast for all but the drier regions and frost affected areas.

The expected decreases in production in Australia, Canada and the European Union, combined with strong EU demand for canola oil, are likely to sustain high prices. Prices are forecast to average close to \$410 a tonne in the 2001-02 marketing year, a rise of over 20 per cent on the previous year.

Fibres

Prices for wool, cotton and synthetic fibres are expected to fall in 2001-02, mainly because of lower world economic growth and weaker demand.

In the case of cotton, prices are likely to stay low as production grows and consumption remains flat.

Competition between all three fibres is expected to remain intense, thus helping keep prices low.

Wool

From an average of 801 cents a kilogram (clean) in July, the Australian eastern market indicator price of wool fell to an average of 702 cents a kilogram in November 2001.

With wool supply also down from the previous year, the fall in prices was mainly the result of weaker demand for raw wool as consumer spending on textiles and apparel in major consuming countries slowed.

While an easing in demand was previously expected, the events of recent months have led to further downward revisions to prospects for world economic growth. This has contributed to the decline in Australian wool prices being more sudden and severe than previously expected.

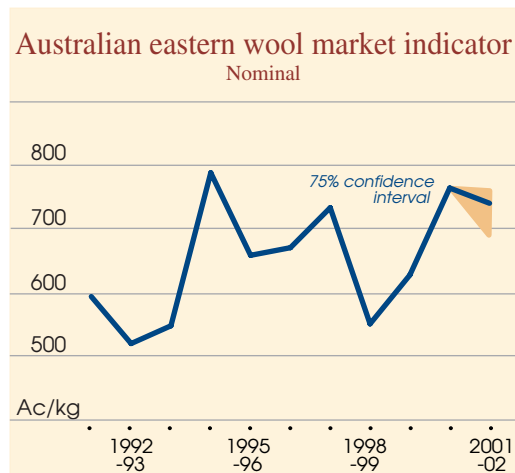
Uncertainty about the extent of the downturn in world economic growth, the timing and rate of recovery, and the consequent effect on demand, are the major influences

for wool prices in the year ahead. In particular, economic growth in the US and Asian economies in 2001-02 is expected to have a major influence on market outcomes.

The low value of the Australian dollar relative to other major currencies has cushioned the effect on producers of weaker global demand for fibres. Because of the low Australian dollar, wool prices (in US dollar terms) remain attractive relative to prices of substitute fibres.

Reflecting the above factors, the Australian eastern market indicator price of wool is forecast to fall by around 3 per cent to average 740 cents a kilogram in 2001-02.

Reflecting uncertainties about the timing and extent of the downturn in demand, there is a 75 per cent probability that the Australian eastern market indicator will be in the range 690-760 cents a kilogram.



Lower Australian exports in 2001-02

Strong demand in 2000-01 resulted in a 6.5 per cent increase in Australian exports of raw and semiprocessed wool, to 855 000 tonnes (greasy equivalent).

However, Australian exports of wool are forecast to fall by around 16 per cent in 2001-02 because of reduced supplies and weaker end user demand.

Demand for Australian wool in countries that import raw and semiprocessed wool and subsequently reexport finished and semifinished products is being adversely affected by the downturn in consumer spending in key wool consuming markets such as Japan and the United States.



Exports of raw and semiprocessed wool over the nine months to September 2001 were around 3 per cent lower than in the previous year. All of this slowdown has occurred since June, as exports for the calendar year to May were actually higher than in the previous year.

In contrast to the overall export decline, shipments to China rose by over 6 per cent for the nine months to September 2001. Over the remainder of the year, however, exports to China are forecast to fall slightly, although strong domestic demand for textiles and apparel is expected to partly offset weaker demand for Chinese manufactured textiles and apparel in export markets.

Exports to Chinese Taipei fell by around 27 per cent in the nine months to September 2001. With demand for imported textiles in Japan and the United States likely to remain subdued, exports of Australian wool to Chinese Taipei are expected to remain low in 2001-02.

With slower economic growth in the Republic of Korea, shipments of Australian wool for the nine months to September 2001 fell by nearly 3 per cent. Continued low economic growth in Korea can be expected to result in exports in 2001-02 being down from the year before.

Shipments of Australian wool to western Europe also declined in the nine months to September 2001, by around 7 per cent. While exports to each of the major western European markets for Australian wool were lower, the most significant decline was in Germany — down by nearly 23 per cent on the same period in 2000. Weak economic growth in western Europe is forecast to result in lower shipments of Australian wool to that region in 2001-02.

Lower sheep numbers

New Australian Bureau of Statistics' data on sheep slaughter, lamb markings and live sheep exports suggests that the sheep flock is smaller than previously thought. Closing flock numbers for June 2000 and 2001 are now estimated to have been 116 million and 113 million in those two years respectively,

		1998	1999	2000	2001	% change
	Unit	-99	-2000	-01 p	-02 f	
Sheep numbers	million	115	116	113	111	-1.8
Sheep shorn	million	148	144	140	140	0.0
Wool production (greasy)						
- shorn	kt	641	620	602	596	-1.0
- other	kt	46	46	50	48	-4.0
- total	kt	687	666	652	644	-1.2
Total closing stocks						
- weight (greasy)	kt	376	263	130	99	-23.8
Wool exports (balance of payments basis)						
- volume (gr. equiv.)	kt	681	803	855	717	-16.1
- value	A\$m	2 583	2 963	3 897	3 465	-11.1
Market indicator (clean)						
- eastern	Ac/kg	550	627	764	740	-3.1
- western	Ac/kg	483	506	619	600	-3.1
Auction price (gr.)	Ac/kg	323	357	495	450	-9.1

See back tables for more details. p Preliminary. f ABARE forecast.

Wool

Despite supply being lower, wool prices are forecast to fall in 2001-02 because of weaker demand



A major risk facing wool prices is uncertainty about the extent and longevity of the world economic downturn, and the effect on demand

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about 3 million less than earlier estimates. These new figures are consistent with other industry data, such as shorn wool production and ABARE farm survey data.

With prices for lamb and mutton remaining high relative to wool, the turnoff for slaughter is again expected to be relatively high in 2001-02. As a result, sheep numbers are forecast to fall by 2 per cent to 111 million by next June.

Lower shorn wool production

Estimates of broker and dealer receivals of shorn wool in 1999-2000 have been revised down by the Australian Bureau of Statistics. When adjusted for changes in farm stocks, shorn wool production in 1999-2000 is estimated to have been 620 000 tonnes (some 7000 tonnes lower than the previous estimate for that year).

With lower sheep numbers, and reduced fleece weights because of dry seasonal conditions in many wool growing areas, shorn wool production is estimated to have been 602 000 tonnes in 2000-01.

As sheep numbers are expected to decline again this year, shorn wool production in 2001-02 is forecast to be down a further 1 per cent to 596 000 tonnes.

Despite an overall decline at the national level, shorn wool production is forecast to increase in New South Wales, Victoria and Tasmania because of improved seasonal conditions and higher average fleece weights.

Cotton

Prices to remain low in 2001-02

The Cotlook 'A' index, a measure of world cotton prices, is forecast to average just under US45c/lb in 2001-02, a fall of 24 per cent from the 2000-01 price and the lowest yearly average price in almost thirty years in nominal and real terms.

There are two main reasons for this forecast — first is that a slowing world economy is expected to reduce demand for textiles and apparel and hence demand for raw cotton; and second is a forecast 10 per cent increase in world cotton production in 2001-02.

Record world production

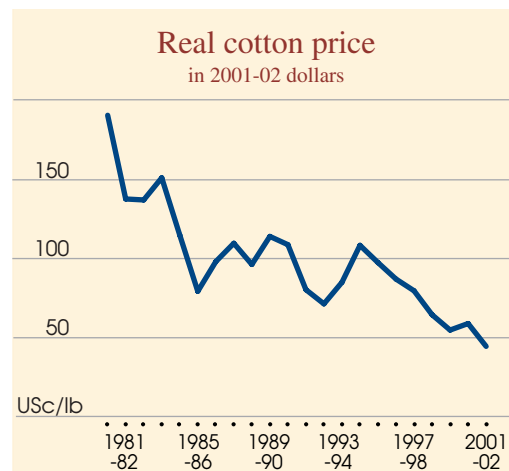
World cotton production in 2001-02 is forecast to be a record 21.1 million tonnes, up from 19.2 million tonnes in the previous year. This increase is being driven by developments in several northern hemisphere countries, particularly China, the United States and India. Production in the southern hemisphere, where the season is six months behind the northern hemisphere, is expected to decrease as low world cotton prices discourage planting.

Cotton production in China is forecast to increase by 13 per cent in 2001-02 to around 5 million tonnes. High domestic cotton prices, sheltered from world price movements by China's import restrictions, have encouraged increased plantings and increased production.

The United States is forecast to produce a record 4.4 million tonnes of cotton in 2001-02. Producers in the United States are currently guaranteed a minimum price of around US52c/lb for cotton, effectively insulating them from changes in world cotton prices.

Proposed changes to the US farm bill, if adopted, may lead to further increases in support provided by these programs. Any expansion in support mechanisms could encourage US farmers to keep planting large areas to cotton into 2002-03, despite low world prices.

An increased area planted to cotton in India in 2001-02 is forecast to result in production increasing by 19 per cent to 2.7 million tonnes. Favorable weather during



the season combined with the larger area planted are the main factors contributing to the increased production.

Demand to fall

Lower world economic growth is contributing to weaker consumer demand for textiles. Reduced end user demand for textiles can be expected to flow through the marketing chain and reduce the demand for raw cotton. Raw cotton consumption, however, is forecast to remain around 20 million tonnes in 2001-02 as the lower prices make cotton very competitive relative to other fibres.

Although China continues to be the world's largest consumer of raw cotton, its import restrictions and stock reduction policy will generally ensure that cotton will be sourced from domestic suppliers rather than overseas producers in 2001-02. China's recent entry to the World Trade Organisation will, however, provide an impetus to import growth as import restrictions are progressively lowered.

US consumption of raw cotton has fallen continuously since 1997-98. The relative strength of the US dollar has made it difficult for domestic mills to compete against overseas manufacturers. A slowing US economy, falling consumer confidence and poor retail demand have further discouraged textile mills from increasing their consumption of raw cotton in 2001-02.


Despite the downturn in world economic activity, raw cotton consumption in most other cotton consuming countries is forecast to remain relatively unchanged in 2001-02. The low price of cotton relative to other fibres is expected to ensure that cotton remains in solid demand over the longer term.

Lower Australian cotton plantings

The area sown to cotton in Australia is forecast to fall by 23 per cent in 2001-02, largely because of low world cotton prices. Helping cushion growers from the full effect of the large fall in world prices is Australia's favorable exchange rate and the substantial price premiums prevailing for the high quality cotton produced in this country. Australian production of cotton is forecast to fall by 18 per cent in 2001-02 to around 618 000 tonnes.

The area sown to irrigated cotton is forecast to fall by 14 per cent in 2001-02. This is in contrast to the area under dryland cotton, which is forecast to fall by 74 per cent. Dryland production generally provides lower returns than irrigated cotton and has more weather related risks associated with its production. Therefore, as cotton prices fall, more dryland areas will be taken out of cotton production than irrigated areas.

In general terms, the area sown to irrigated cotton tends to be less responsive to changes in cotton prices because of the large sunk costs associated with irrigated cotton

							Cotton
	Unit	1998 -99	1999 -2000	2000 -01 p	2001 -02 f	% change	
World							<i>World prices are unlikely to recover in the short term as supply rises faster than consumption and stocks increase</i>
Production	Mt	18.5	19.0	19.2	21.1	9.9	
Consumption	Mt	18.6	20.0	20.0	20.0	0.0	
Closing stocks	Mt	9.8	9.0	8.5	9.6	12.9	
Stocks to consumption ratio	%	52.9	45.2	42.5	48.3	13.6	
Cotlook 'A' index	USc/lb	60.2	52.5	58.4	44.6	-23.6	 <i>Australian cotton plantings are forecast to fall in 2001-02 as a result of low world prices</i>
Australia							
Area harvested	'000 ha	562	464	504	388	-23.0	
Lint production	kt	716	741	751	618	-17.7	
Exports	kt	647	703	834	668	-19.9	
- value	A\$m	1 559	1 407	1 957	1 352	-30.9	
See back tables for more details. p Preliminary. f ABARE forecast.							Contact: Nathan Hanna +61 2 6272 2121

production. These large sunk costs, particularly in irrigation infrastructure such as water storage, channels and land forming, make it economically difficult to substitute other crops for cotton on a short term basis. The area sown to dryland production is more price sensitive because it has less sunk costs and so substituting between crops is generally easier and less costly.



Meat

Despite a slowing world economy, Australian beef prices are forecast to remain firm in 2001-02 as continuing weakness in the Australian dollar ensures that Australian beef remains competitively priced in export markets. Cattle turnoff is forecast to ease as producers continue to rebuild herds.

Supplies of lamb and mutton are forecast to tighten in 2001-02, resulting in higher saleyard prices for sheep meat. While export demand is forecast to remain firm, exports of sheep meat are forecast to decline in 2001-02 as a result of lower production. Live sheep exports are forecast to increase as demand in the key market of Saudi Arabia continues to grow.

Beef and veal

Cattle prices to remain solid

Australian saleyard cattle prices are forecast to rise by almost 17 per cent in 2001-02 to an average of 310 cents a kilogram (dressed weight). Lower Australian beef production, as producers focus on herd rebuilding, is forecast to underpin higher beef saleyard prices.

In the September quarter, the Australian saleyard indicator price of cattle averaged 335 cents a kilogram. From a peak of 363 cents a kilogram in September, prices fell following confirmation of Japan's first case of BSE (bovine spongiform encephalopathy or 'mad cow' disease) late in the month and a consequent substantial drop in demand for beef in that market. Saleyard prices were around 10 per cent lower in October. A reduction in turnoff of cattle for slaughter contributed to a 5 per cent recovery in cattle

prices in November, with saleyard cattle prices averaging around 350 cents a kilogram.

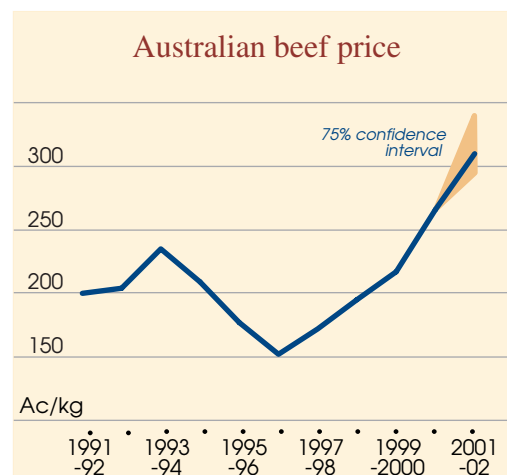
As economic growth in the United States eases, demand for beef in that market is likely to weaken. However, lower demand for beef in the United States is most likely to have a greater affect on demand for high value beef products, with food service demand for competitively priced Australian beef forecast to remain firm.

Canadian demand for Australian beef is also forecast to remain firm owing to lower beef production in that country and reduced beef imports from south America in response to concerns about foot and mouth disease.

Following two confirmed cases of BSE in Japan, beef consumption in that market is forecast to be markedly lower in 2001-02, resulting in a sharp decline in demand for Australian beef.

In Korea, however, demand for Australian beef is forecast to strengthen as market liberalisation results in greater opportunities for Australian exporters, and high prices for domestic Korean hanwoo beef stimulate increased imports of competitively priced Australian beef.

Reflecting uncertainty about factors such as demand developments in Japan and the ultimate extent of the economic downturn in the United States, there is a 75 per cent probability that the final average Australian saleyard indicator price of beef will be in the range 295-340 cents a kilogram.



	Unit	1998 -99	1999 -2000	2000 -01 p	2001 -02 f	% change	<div>Meat</div> <div>Poultry meat is forecast to equal beef as the most popular meat with Australian consumers in 2001-02, as higher retail prices make beef less competitive</div> <div>◆</div>
Retail prices							
Beef	Ac/kg	990	1 041	1 112	1 248	12.2	
Lamb	Ac/kg	710	725	763	860	12.7	
Pig meat	Ac/kg	775	850	885	976	10.3	
Poultry meat	Ac/kg	349	359	354	367	3.7	
Consumption per person							
Beef	kg	37.0	37.7	33.1	32.2	- 2.7	
Mutton	kg	5.3	5.4	5.7	5.0	- 12.3	
Lamb	kg	11.5	12.5	12.2	11.3	- 7.4	
Pig meat	kg	19.7	19.8	18.1	18.3	1.1	
Poultry meat	kg	30.6	31.9	32.5	32.4	- 0.3	

See back tables for more details. p Preliminary. f ABARE forecast.

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Marginally lower Australian beef and veal production

Cattle turnoff in the September quarter was approximately 2 per cent lower than for the same quarter in 2000. Cow and heifer slaughter was 4.5 per cent lower in the September quarter when compared with the same period last year, while calf slaughter fell by 12 per cent. The decline in slaughterings of calves and female cattle in the September quarter, following that in the June quarter, suggests that producers are continuing to focus on longer term herd rebuilding.

While cattle turnoff is forecast to be 2 per cent lower in 2001-02, Australian beef and veal production is forecast to ease by only 1 per cent as the proportion of heavier weight male cattle in the total slaughter increases.

The number of cattle on feed in Australia has continued at record levels, with approximately 742 000 cattle on feed at 30 September 2001, around 15 per cent higher than at the same time in 2000. About 56 per cent of cattle on feed in the September quarter were destined for the Japanese market. With demand for beef in Japan forecast to fall following the confirmation of BSE in that country, placements of cattle on feed in Australia are forecast to fall over the remainder of 2001-02.

Slight decrease in beef exports

Australian beef and veal exports are forecast to be around 1 per cent lower in 2001-02 at 950 000 tonnes, largely as a result of lower beef production.

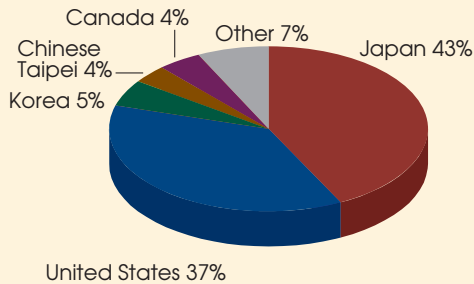
Despite lower beef exports, Australian export returns in 2001-02 are forecast to rise

	Unit	1998 -99	1999 -2000	2000 -01 p	2001 -02 f	% change	<h2>Beef and veal</h2> <p><i>Australian saleyard beef prices are forecast to rise in 2001-02 as domestic beef production eases, and demand in north America remains firm</i></p> <p>◆</p> <p><i>Exports of beef and veal to Japan are forecast to fall in response to concerns about BSE in their domestic herd</i></p>
Cattle							
numbers	million	26.6	27.6	28.8	29.1	1.0	
Slaughterings	'000	9 097	8 649	8 695	8 527	- 1.9	
Production	kt	2 011	1 988	2 054	2 034	- 1.0	
Exports (shipped weight)							
- to United States	kt	288	312	389	380	- 2.3	
- to Japan	kt	314	326	336	310	- 7.7	
- to Korea, Rep. of	kt	73	69	57	62	8.8	
Total	kt	883	852	959	950	- 0.9	
Export value	A\$m	2 863	3 119	4 007	4 127	3.0	
Live cattle	'000	713	846	846	855	1.1	
Saleyard price	Ac/kg	195	217	266	310	16.5	

See back tables for more details. p Preliminary. f ABARE forecast.

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**Value of Australian
beef and veal exports**
2000-01=A\$4 billion



by 3 per cent to \$4.1 billion. Higher Pacific rim beef prices, and continuing weakness in the Australian dollar are forecast to support higher beef export earnings.

BSE clouds Japanese beef market

On 21 September, Japan's first case of BSE was confirmed in a five year old dairy cow, with a second case confirmed in late November. Following incidents of BSE in Britain, Japan had placed a voluntary ban on the use of meat and bone meal for feed purposes in 1996. The recent BSE incidents have prompted Japan to legally enforce this ban and to also temporarily suspend imports of such material.

Measures being undertaken by Japan to deal with the BSE issue include a requirement for Japanese meat processors to discard cattle parts that increase the risk of BSE being transferred to humans, while a BSE testing program was also established in October. This program requires compulsory BSE testing of cattle aged thirty months or more when slaughtered.

Following the detection of BSE, Japanese beef consumption fell markedly. Retail sales of beef are reported to have fallen by around 30-40 per cent, while food service sales are around 10 per cent lower. Consumption of poultry, pork and fish in Japan has increased as consumers substitute alternative proteins for beef. Reduced demand for beef has affected Japanese domestic cattle prices, with average wholesale prices for beef carcasses in October being about 17 per cent lower than in September.

Japan is the second largest export destination for Australian beef by volume, and is the largest export destination by value. Approximately 336 000 tonnes of beef and veal were shipped to Japan in 2000-01, with a value of A\$1.7 billion. Beef and veal exports to Japan in October were around 7 per cent lower than exports in September, and are expected to remain subdued over the remainder of calendar 2001.

Assuming that no further BSE cases are confirmed in Japan, beef consumption in that market is forecast to recover gradually in the second half of the financial year. Australian exports of beef and veal to Japan are forecast to be 7.7 per cent lower in 2001-02, at around 310 000 tonnes.

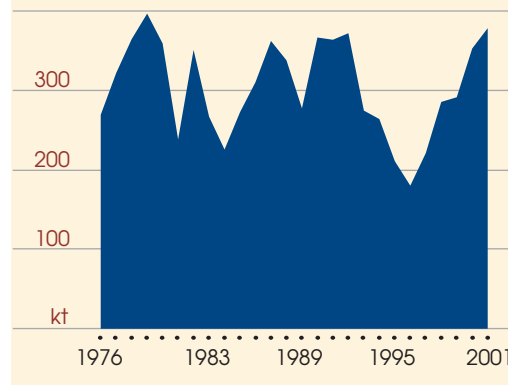
With Australian beef exports to Japan forecast to be lower in 2001-02 the beef and veal that would have previously been exported to Japan is expected to be diverted to other, albeit lower value, markets including Korea, Chinese Taipei and Canada.

Quota restrictions constrain beef exports to the United States

Australian beef exports to the United States are limited by a quota of 378 000 tonnes (calendar year basis), which was set in 1994 as part of the World Trade Organisation Agreement on Agriculture.

During calendar 2001, reduced cow slaughter and nonfed beef production in the United States, lower import prices for Australian beef in US currency terms, and higher Australian beef and veal production have resulted in increased exports of beef to

**Australian beef and veal exports
to the United States**



the United States. As a result, Australian exports are likely to be close to the US quota limit this calendar year.

Over the ten months to October, beef exports to the United States totaled approximately 349 000 tonnes, which was 20 per cent higher than for the corresponding period in calendar 2000. If Australia reaches its quota limit before the end of the calendar year, any beef shipped to the US market in excess of the quota is likely to be held in bond until January.

US beef production is forecast to be marginally lower in 2001 as improved seasonal conditions in recent months, and lower overall cattle numbers, have resulted in an easing of the number of cattle being placed on feed. In the ten months to October, slaughterings of calves in the United States were 12 per cent lower than in the corresponding period a year earlier, while heifer slaughter was 4 per cent lower, which indicates that the US beef industry may be commencing its herd rebuilding phase. With US herd rebuilding expected to continue in 2002, US beef production is expected to ease further.

Despite an assumed weakening of the US economy, lower supplies of beef in the United States through herd rebuilding, and with Australian beef expected to remain competitively priced in US currency terms, demand for Australian beef in the United States is expected to remain solid. However, Australian beef and veal exports to the United States are forecast to be 2.3 per cent lower in 2001-02 at around 380 000 tonnes as quota restrictions limit beef exports to that market.

High prices constrain live cattle exports

High cattle prices and weak demand in key importing markets are constraining growth in live cattle exports. During the first quarter of 2001-02, live cattle exports to all destinations were 2 per cent lower, while the average unit value of cattle exported increased to \$612 a head, about 27 per cent higher than in the same period in 2000-01.

Live cattle exports are forecast to rise by 1 per cent in 2001-02, as demand in key importing markets improves, albeit slowly. However, there is some uncertainty about

market prospects for live cattle exports because of lower economic growth in the United States, and the resulting effect this will have on economic conditions and subsequent demand for live cattle imports in south east Asian markets.

High prices for Australian cattle are being passed on to Indonesian consumers at the retail level, resulting in some easing in demand for beef. However, as the value of the Indonesian rupiah has strengthened relative to the Australian dollar, live cattle exports to Indonesia have been slowly improving. Live cattle exports to Indonesia increased by 13 per cent in the first quarter of 2001-02 when compared with the same period a year earlier, and are forecast to continue increasing over the remainder of the financial year as demand improves.

Live cattle exports to the Philippines remain low, largely as a result of high prices for Australian cattle and the weak Philippine peso. High beef prices are resulting in Philippine consumers substituting greater quantities of buffalo, poultry and pig meat in place of beef. During the September quarter, live cattle exports to the Philippines were around 43 per cent lower than for the same period in 2000-01. With prices for Australian cattle forecast to remain strong and with continuing weakness of the Philippine currency assumed, live cattle exports to the Philippines are forecast to remain low.

In 2000-01, around 215 000 cattle were exported to Egypt, making it the second largest market for Australian live cattle exports. Egypt has recently announced that it will reopen its market to imports of beef from Ireland following a general ban earlier in the year on beef imports from the European Union in response to BSE concerns. Irish beef imports, however, must meet strict criteria for the Egyptian market. This includes beef being tested for BSE, and only coming from cattle aged less than two years.

It is unclear how quickly Irish beef imports will regain market share in Egypt. However, increased beef imports from Ireland will create additional competition for Australian live cattle in that market.



Sheep meat

Higher lamb prices as supply eases

Reduced availability of lambs for slaughter and strong export demand are forecast to result in a 14 per cent rise in Australian saleyard lamb prices in 2001-02, to an average of 230 cents a kilogram.

Lamb slaughter is forecast to be 5 per cent lower in 2001-02, at almost 17.6 million, as improved wool prices in the previous financial year, combined with relatively low lamb prices at the time of joining, prompted many producers to join fewer ewes for meat production.

Lower lamb exports

Despite continuing strong demand from offshore, reduced production is forecast to result in Australian lamb exports falling by 4 per cent in 2001-02 to 110 000 tonnes.

During the first quarter of 2001-02, lamb exports to all but one major export destination were lower than in the corresponding period in 2000-01. Exports to the United States were the exception, increasing by almost 9 per cent during the quarter.

Demand for imported lamb in the United States, Australia's largest single market for lamb in both volume and value terms, is continuing to grow. With lamb production down in Australia, exporters are diverting product away from low value markets in order to satisfy US demand.

However, with economic growth in the United States assumed to be lower in 2001-

02, growth in lamb exports to the US market is forecast to ease over the remainder of year. Particularly affected is likely to be demand for high value product, such as chilled racks, that are predominantly used in the food service industry.

Despite some slowing in the rate of growth, lamb exports to the United States are nevertheless forecast to be 7 per cent higher in 2001-02 at 30 000 tonnes.

US lamb production continues to decline

Tariff rate quota restrictions on imported lamb, introduced by the US administration to allow its domestic lamb industry to adjust to increased import competition, were terminated on 15 November 2001. Despite the assistance provided by the tariff rate quota, US lamb production continues to decline. Over the ten months to October 2001, US lamb production was around 82 000 tonnes, 4 per cent lower than for the corresponding period in calendar 2000.

In exchange for the US lamb industry's agreement to removing tariff rate quota restrictions on imported lamb, the US administration has allocated a US\$42.7 million aid package over the next three years to help the domestic lamb industry adjust to import competition. This package will fund initiatives including a ewe retention program designed to arrest the decline in domestic lamb production.

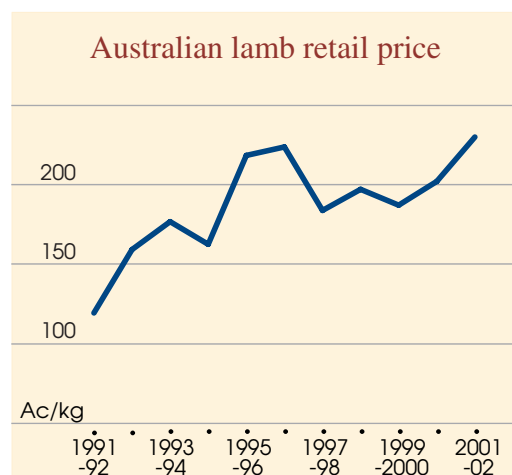
With demand for sheep meat in the United States staying solid and with US domestic production of lamb remaining low, demand for imported lamb from both Australia and New Zealand is forecast to remain firm.

Mutton prices to strengthen

Mutton production is forecast to fall by 7 per cent in 2001-02 as lower overall sheep numbers constrain the availability of sheep for slaughter. The lower supplies and solid demand mean saleyard mutton prices are forecast to increase by 17 per cent to 118 cents a kilogram (dressed weight).

Lower mutton exports

Mutton exports are forecast to fall by 5 per cent in 2001-02 to 171 000 tonnes, largely as a result of lower production.



South Africa is the largest single export market for Australian mutton, accounting for 18 per cent of total shipments of mutton in 2000-01. However, South Africa is a low value, price sensitive market, where Australian mutton often competes against competitively priced poultry and subsidised beef from the European Union. Additionally, mutton imports are further constrained by a 40 per cent tariff on red meat imports.

Reduced supplies of Australian mutton and higher prices have resulted in mutton exports to South Africa falling by 46 per cent in the ten months to October compared with the corresponding period of calendar 2000. With Australian mutton prices forecast to stay high, mutton exports to South Africa are expected to remain depressed in the short term.

Strong demand for live sheep

Import bans on live sheep from north Africa, due to rift valley fever, and continuing restrictions on imports of meat from the European Union as a consequence of BSE and foot and mouth disease, are resulting in strong Middle East demand for Australian live sheep. Demand for live sheep is forecast to remain firm over the remainder of 2001-02, particularly from Saudi Arabia which is the largest single market for Australian live sheep.

Strong demand, and the low value of the Australian dollar, is resulting in higher prices being paid for live sheep. During the



three months to September, the average unit value of live sheep exported was \$56 a head, 43 per cent higher than for the corresponding period of 2000-01.

Higher returns for live sheep relative to wool are prompting many producers, particularly in Western Australia, to turn off larger quantities of sheep for live export. In the three months to September, live sheep exports were almost 35 per cent higher than in the same period in 2000-01. With returns for live sheep expected to remain buoyant over the short term, live sheep exports are forecast to increase by 5 per cent in 2001-02 to around 6.2 million head.



		1998	1999	2000	2001	% change
	Unit	-99	-2000	-01 p	-02 f	
Slaughtering						
Sheep	'000	14 393	15 585	16 524	15 532	- 6.0
Lamb	'000	16 053	17 557	18 502	17 568	- 5.0
Production						
Mutton	kt	302	328	345	321	- 7.0
Lamb	kt	312	347	365	343	- 6.0
Exports (shipped weight)						
Mutton	kt	155	171	180	171	- 5.0
Lamb	kt	85	99	115	110	- 4.3
- to United States	kt	21	22	28	30	7.1
Live sheep	'000	4 959	4 859	5 936	6 233	5.0
Saleyard prices						
Mutton	Ac/kg	71	61	101	118	16.8
Lamb	Ac/kg	197	187	202	230	13.9

See back tables for more details. p Preliminary. f ABARE forecast.

Sheep meat

Lamb prices are forecast to rise as the availability of stock for slaughter declines and demand remains strong



Live sheep exports are forecast to increase as demand in the Middle East remains firm



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Dairy

Farm gate returns for Australian dairy farmers are forecast to rise in 2001-02, as milk processors pass on the benefits of strong export demand and the low value of the Australian dollar.

Although world prices for most dairy products have eased somewhat in recent months, with the exception of butter they remain well above the lows of 1999-2000.

Milk powder

International spot prices for skim milk powder are forecast to fall by 3 per cent in 2001-02, to average around US\$2100 a tonne. Weaker demand in key importing countries, particularly in south east Asia, and reduced demand for the product as a feed component in EU veal production are the main reasons for the forecast decline in world skim milk powder prices in 2001-02.

Large stocks of skim milk powder in the United States are expected to overhang the market in 2001-02, contributing to downward pressure on world prices.

International spot prices for whole milk powder are forecast to rise by around 5 per cent in 2001-02 to average around US\$2100 a tonne. Demand for whole milk powder has increased as countries that import milk powders for reconstituting as drinking milk or as a food ingredient substitute away from skim milk powder.

Cheese

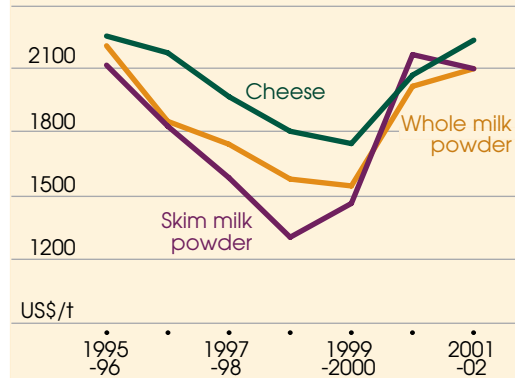
International spot prices for cheese reached a peak of US\$2325 a tonne in June 2001 before falling by around 4 per cent in recent months. Weaker demand as world economic growth slows is the main reason for the decline in prices.

However, overall demand is expected to remain steady for the remainder of 2001-02, with international spot prices for cheese forecast to average around US\$2235 a tonne, nearly 8 per cent higher than for the previous year.

Butter

World butter prices remain subdued, mainly because of weak demand in key importing countries such as the Russian Federation.

World dairy product prices



Increased butter production has also contributed to downward pressure on prices. Nevertheless, despite low prices, world butter production has risen because of increased production of skim milk powder.

With the world butter market situation likely to remain weak over the coming year, international spot prices for butter are forecast to fall slightly in 2001-02, to average around US\$1275 a tonne.

EU milk production exceeds quota

Milk production in the European Union in the first eight months of 2001 remains largely unchanged on the previous year, rising by less than 1 per cent.

However, total EU milk production continues to remain over the internally agreed quota. Under the Berlin agreement, milk quotas in the European Union increased in 2001 and are set to increase again in 2005.

Eight member states produced over their quota in 2000-01, incurring superlevy penalties totaling around 290 million euro. Italy and Germany — two of the largest milk producers in the European Union — had the largest volumes of overquota production.

Overquota production of milk in the European Union is contributing to global production of dairy products being higher than would otherwise be the case, thus exerting downward pressure on world prices.

Higher Australian farm gate returns

Expected increases in world prices for cheese and whole milk powder will be

reflected in higher returns to Australian farmers. Farm gate milk prices are forecast to rise by 7 per cent in 2001-02 to average around 30.2 cents a litre.

Australian milk production to rise

Australian milk production is forecast to rise in 2001-02 after falling in the previous year for the first time in a decade. Improved seasonal conditions in some dairy regions and higher farm gate returns are forecast to result in a 6.5 per cent rise in milk production to 11.2 billion litres.

Despite lower overall farm numbers as some dairy farmers left the industry following deregulation, the Australian Bureau of Statistics has estimated that the Australian dairy cow herd increased by 5 per cent in 2000-01 to nearly 2.3 million. Improved farm gate returns are expected to encourage a further increase in cow numbers to almost 2.4 million by June 2002.

Australian production and exports

With domestic milk production forecast to increase, and only limited growth in fresh milk consumption, milk available for manufacturing production is forecast to increase by nearly 8 per cent to 9.3 billion litres in 2001-02.

Most of the increase in milk availability is expected to be directed to the production of milk powders. In particular, higher world prices for whole milk powder are expected to result in a 9 per cent rise in domestic production in 2001-02, to 230 000 tonnes.

The value of Australian dairy exports is forecast to rise by around 20 per cent to almost \$3.7 billion in 2001-02.

The increase in export value is mainly the result of forecast increases in exports of higher value dairy products such as cheese, milk powders and fresh dairy products as production is directed away from lower valued products such as butter.

Sugar

World sugar prices to fall in 2001-02

The world indicator sugar price, New York no. 11 (September–August, raw), is forecast to average around US8.2c/lb in 2001-02, a fall of 18 per cent from the previous year. This is a downward revision from forecasts presented in the September issue of *Australian Commodities*. A combination of weaker demand resulting from reduced economic activity, and higher than expected Brazilian production, mean that supply will expand faster than consumption in 2001-02.

Prices fell sharply from a high of US10.6c/lb in January 2001 to a low of US6.3c/lb in early October. A recovery to around US8c/lb by late November was mainly driven by temporary regional supply-demand tightness, particularly in European markets.

Continued uncertainty over production, stockholding and trade policies, combined with the usual price variability associated with new information on evolving seasonal

		1998	1999	2000	2001	% change
	Unit	-99	-2000	-01 p	-02 f	
Cow numbers	'000	2 155	2 171	2 281	2 388	4.7
Milk yields	L/cow	4 723	4 996	4 628	4 708	1.7
Production						
Total milk	ML	10 178	10 847	10 556	11 243	6.5
– market sales	ML	1 931	1 934	1 918	1 932	0.7
– manufacturing use	ML	8 247	8 913	8 639	9 311	7.8
Butter	kt	176	172	158	145	–8.2
Cheese	kt	320	369	356	371	4.2
Wholemilk powder	kt	145	187	211	230	9.0
Skim milk powder	kt	255	247	247	258	4.5
Milk price	Ac/L	28.5	26.3	28.2	30.2	7.1
Value of exports	A\$m	2 257	2 439	3 047	3 650	19.8

See back tables for more details. p Preliminary. f ABARE forecast.

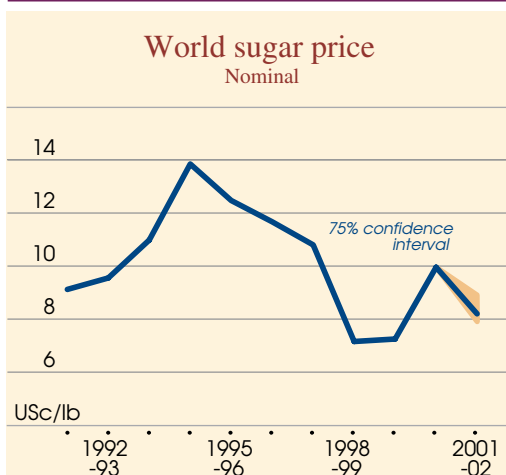
Dairy

World prices, except for butter, remain well above the lows of 1999-2000



Australian milk production is forecast to increase in 2001-02 as cow numbers continue to rise and milk yields improve from the downturn following market deregulation

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conditions in key producing countries are reflected in an estimated 75 per cent probability that the average world price of raw sugar in 2001-02 will be in the range US7.9–8.9c/lb.

World sugar stocks to remain high in 2001-02

World sugar production is forecast to increase by 1.7 per cent to 132.7 million tonnes in 2001-02, following last season's weather affected crops. Higher cane production in Brazil, Australia and some Asian countries is expected to more than offset lower sugar beet production in Europe and the effects of recent cyclone damage to the Cuban cane crop.

However, world sugar consumption is forecast to increase by less than 1 per cent to just over 131 million tonnes in 2001-02, compared with increases of around 2 per cent a year on average over the past five years. The slowing in consumption growth reflects the downturn in world economic growth, particularly in key Asian consuming countries. As a result, early forecasts of a substantial reduction in world stocks have not materialised and the new season will start with stocks remaining high.

Higher Brazilian cane production

With the harvest largely completed, Brazilian sugar production is estimated to be 18.2 million tonnes in 2001-02, around 12 per cent higher than last season's poor crop. This amount is substantially greater than most earlier forecasts and largely reflects

decisions by mill owners to lift sugar production and exports at the expense of ethanol production. The sharp rise in Brazilian exports has been a major contributing factor to lower world prices this year.

Further substantial increases in Brazilian cane production are projected for 2002-03, reflecting generally favorable weather conditions, new areas being planted and older existing plantations being renewed. The potential for large sugar exports from Brazil's new season harvest is likely to maintain downward pressure on world prices. However, a crucial determinant of sugar exports will be movements in the Brazilian currency and government decisions over ethanol prices and blending requirements for gasoline. Currently ethanol stocks are low and the Brazilian government will raise the mandated fuel alcohol content of gasoline to 24 per cent in January 2002. There are plans to raise it to 26 per cent in 2002-03.

European production down

Total European sugar beet production is forecast to fall by almost 10 per cent to 26 million tonnes in 2001-02, with sharp falls in EU production more than offsetting moderate increases in the Ukraine and in other eastern European sugar producing countries. Reflecting poor seasonal conditions, total EU production is forecast to fall by 12 per cent to 16.1 million tonnes in 2001-02, the lowest since 1994-95. With a tighter supply-demand situation, white sugar premiums (London, for early 2002 delivery) have remained high at around US\$75 a tonne above raw sugar prices.

Asian production higher in 2001-02

Sugar production in Asia is forecast to rise by 3.6 per cent to a record 43.2 million tonnes in 2000-01 largely as a result of bigger crops in China, Thailand, the Philippines and Pakistan. Production in China is forecast to be around 7.5 million tonnes — up 1 million tonnes on last year's harvest. In India, Asia's largest producer, production is forecast to be around 19 million tonnes in 2001-02, down 5 per cent on last year's record crop.

However, demand for sugar in Asian countries remains subdued — with total consumption forecast to rise by just over

	Unit	1998 -99	1999 -2000	2000 -01 p	2001 -02 f	% change	
World							Sugar
Production	Mt	134.7	134.2	130.5	132.7	1.7	<i>World sugar prices are forecast to fall in 2001-02, reflecting higher Brazilian production and sluggish world demand</i>
Consumption	Mt	125.4	128.2	130.1	131.2	0.8	
Stocks	Mt	56.8	61.0	59.8	60.0	0.3	
Stocks to consumption ratio	%	45.3	47.5	46.0	45.7	-0.7	
Price	USc/lb	7.2	7.2	10.0	8.2	-18.0	◆
Australia							<i>Higher Australian sugar production and exports will offset the effect on export earnings of lower global prices</i>
Area	'000 ha	414	419	411	417	1.5	
Production	kt	4 998	5 448	4 162	4 662	12.0	
Exports	kt	3 961	4 131	3 125	3 483	11.5	
- value	A\$m	1 289	1 092	1 156	1 172	1.4	
See back tables for more details. p Preliminary. f ABARE forecast.							Contact: Philip Knopke +61 2 6271 2088

1 per cent to 51.2 million tonnes in 2001-02 following a 2.8 per cent increase the previous year. In China, higher domestic sugar prices have led to an increase in the production and marketing of artificial sweeteners. With the Japanese economy in recession, consumption in that country is expected to fall in 2001-02. Slower economic growth in India, Indonesia and the Philippines will also contribute to weaker Asian demand for sugar.

Higher returns for Australian producers in 2001-02

Australian sugar production is forecast to be around 4.6 million tonnes in 2001-02, 12 per cent higher than last year's weather damaged crop. With a larger crop expected in 2001-02, Australian sugar exports are forecast to

increase by 12 per cent to almost 3.5 million tonnes.

With most of this season's harvesting and crushing completed, the Queensland sugar cane crop is estimated to be just under 30 million tonnes in 2001-02, yielding around 4.3 million tonnes of raw sugar. Sugar production has been boosted by a high sugar content with average CCS (commercial cane sugar) content of 14.4 per cent in 2001-02, compared with 13.5 per cent in the previous year.

Australian grower returns are also forecast to increase substantially in 2001-02, despite the decline in world sugar prices. In contrast to last season, marketers were able to forward sell a significant proportion of the crop at higher prices than were available in the first half of 2000.

Minerals and energy

Outlook to 2001-02



Average prices received for Australian minerals and energy exports are forecast to fall in 2001-02, as a result of lower world minerals and energy prices.



The volume of Australian mine production is forecast to rise modestly in 2001-02 with increases in coal, gas, base metals and iron ore offsetting lower oil production.



Total earnings from Australian minerals and energy exports in 2001-02 are forecast to fall only moderately to \$55.6 billion as increasing volumes of most minerals and energy exports partly offset falling world prices.

World outlook

As a result of the significant downturn in world minerals and energy markets throughout 2001, which was further exacerbated by the terrorist attacks on 11 September in the United States, the earnings outlook in 2001-02 for most of Australia's minerals and energy export industries has become negative.

The demand for a range of minerals and energy commodities at the end of 2001 has become increasingly uncertain, against a background of further slowing in the US economy and the flow-on effects to global economic growth.

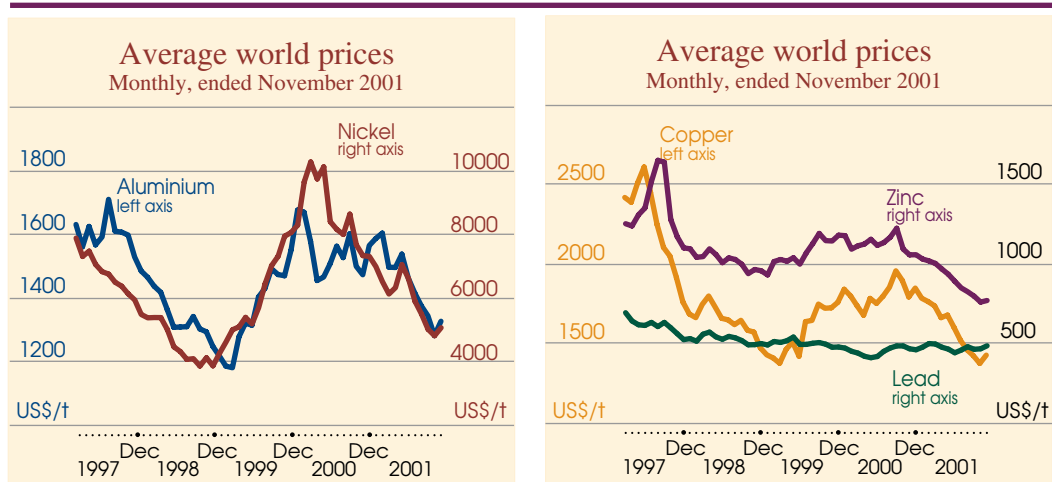
Weaker growth in world demand in 2001...

As a result of slower world economic growth and a reduction of industrial production in OECD economies, demand for minerals and energy commodities fell in 2001. World oil consumption is estimated to have increased by only 0.1 per cent in 2001 and consumption of a range of metals is estimated to have fallen by 1-8 per cent.

Minerals and energy production in 2001, on the other hand, continued to rise in most cases, with base metals production increasing by 1-4 per cent while oil and aluminium production increased by 0.3 per cent. Consequently, stocks of most mineral commodities increased significantly through the year (40-70 per cent) and oil stocks rose by 6 per cent.

Crude oil prices are estimated to average around 16 per cent lower in 2001. Metal prices (except for lead) also fell: gold prices are estimated to average 3 per cent lower, aluminium 8 per cent lower, copper down 13 per cent, zinc down 21 per cent and nickel down 31 per cent.

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... but demand growth to improve in 2002

Following the events of 11 September, consumer confidence in the United States

and elsewhere in major minerals and energy consuming countries has fallen considerably. This in turn has led to greater reductions in minerals and energy consumption than

Major indicators of Australia's mineral resources sector

	Unit	1996 -97	1997 -98	1998 -99	1999 -2000	2000 -01 p	2001 -02 f	Change from previous year 2000-01 %	2001-02 %
Australian exports									
Unit returns a									
Energy minerals	index	100.0	102.8	93.9	107.1	135.7	128.9	26.7	-5.0
Metals and other minerals	index	100.0	109.0	106.3	113.8	133.1	124.4	17.0	-6.5
Total mineral resources	index	100.0	106.4	101.2	111.1	134.8	126.9	21.3	-5.9
Value of exports									
Energy minerals	A\$m	13 883	15 639	14 393	18 422	25 677	24 760	39.4	-3.6
Metals and other minerals	A\$m	22 557	25 545	24 785	25 997	30 759	30 884	18.3	0.4
Total	A\$m	36 441	41 184	39 178	44 419	56 435	55 645	27.1	-1.4
Mine production									
Volume									
- energy	index	92.4	100.0	93.2	109.4	114.9	115.4	5.0	0.4
- metals and other minerals	index	94.6	100.0	99.4	103.5	112.6	114.8	8.8	2.0
Total	index	93.4	100.0	95.8	106.8	113.9	115.1	6.6	1.1
Gross value	A\$m	35 035	39 537	37 611	42 679	54 178	53 419	26.9	-1.4
New capital expenditure b	A\$m	8 781	11 029	8 725	5 287	5 248	8 400	-0.7	60.1
Exploration expenditure									
Petroleum	A\$m	853	981	868	723	1 044	na	44.3	na
Metallic and other minerals	A\$m	1 148	1 067	838	676	722	na	6.7	na
Total	A\$m	2 001	2 048	1 706	1 399	1 765	na	26.2	na

a Base: 1996-97 = 100. In this table the **unit return** indexes have been re-referenced from the base years used in the original data sources and in the statistics section of this publication. b Mining industry (ANZSIC subdivision B) only. p Preliminary. f ABARE forecast. na Not available.

Note: ABARE revised the method for calculating **production** indexes in October 1999. The indexes for the different groups of commodities are now calculated on a chained weight basis using Fishers' ideal index with a reference year of 1997-98 = 100. Sources: Australian Bureau of Statistics; ABARE.

previously expected, particularly in the United States, Japan and to a lesser extent in Europe and Asia.

With industrial and economic activity in key consuming regions expected to remain weak in the first half of 2002, minerals and energy demand is forecast to fall further early in the year. In the second half of the year, however, global economic conditions are expected to improve and minerals and energy demand is expected to pick up. For the year as a whole, world consumption is forecast to rise, by 2–5 per cent for metals and by around 1 per cent for crude oil.

World supply growth the key to price outcomes

With demand not expected to improve until the second half of 2002, rates of growth in world production of minerals and energy commodities in 2002 will have the most influence on the direction of world prices. Although some minerals and energy producers have announced the prospect of significant cuts to production in 2002, overall world production is forecast to increase.

For example, announcements to date for cuts to copper and zinc production total around 700 000 tonnes and 300 000 tonnes respectively. However, production of these metals is forecast to increase by 1 per cent for copper and nearly 5 per cent for zinc.

For oil, OPEC members have proposed production cuts of 1.5 million barrels a day to be implemented from 1 January 2002. However, this proposed cut is subject to non-OPEC producers reducing their production by half a million barrels a day. On balance, ABARE is forecasting total oil production to increase by over 1 per cent in 2002.

World prices to average lower for most commodities in 2002

With demand not expected to pick up until the second half of 2002 and announced production cuts not expected to significantly slow growth in supplies, stocks of most metals and energy commodities are forecast to increase further by the end of 2002.

Average world prices are forecast to be 1–5 per cent lower in 2002 for aluminium, copper, zinc and nickel. Average crude oil prices are forecast to fall by 26 per cent.

The world gold price on the other hand is forecast to rise slightly, by 1.5 per cent, to US\$275 an ounce. While demand for fabricated gold products is expected to be lower in 2002, forecast lower production and an expected weakening of the US dollar against some currencies is expected to place upward pressure on gold prices.

Bulk commodity prices to come under pressure

Prices for the bulk minerals, iron ore and coal, are also likely to come under pressure in early 2002. Japanese steel production is forecast to decline in Japanese fiscal year (JFY, April–March) 2002–03 as a result of lower exports of steel and steel intensive manufactured products, and weaker domestic demand associated with lower industrial production. Further, economic growth elsewhere in Asia is forecast to remain below 5 per cent in 2002 — considerably lower than the growth rates experienced during the 1990s.

In addition, Australia is facing stronger competition from both China and Indonesia in the supply of coal into the Asian market. With increasing competition among coal suppliers in the Asian region and subdued demand expected for most of 2002, downward pressure is expected on both coal and iron ore prices during contract negotiations early in the year.

Australian outlook

Export prices lower

Average prices (in Australian dollars) received by Australia's minerals and energy exporters are forecast to fall by nearly 6 per cent in 2001–02, as a result of weaker world oil and metals prices. While average prices for metals and related minerals are forecast to fall by nearly 6.5 per cent, energy mineral prices are forecast to be 5 per cent lower.

Growth in mine production easing

The volume of Australian mine production is forecast to rise modestly — by 1.1 per cent — in 2001–02. This follows a 6.6 per cent increase in output in 2000–01.

Australian production of metallic and related minerals is forecast to increase by

2 per cent in 2000-01. The forecast modest expansion of this sector is expected to be fairly broadly based, with the base metals and iron ore industries contributing most to this growth.

Total production of energy is forecast to remain fairly flat in 2001-02. Moderate expansion in production in the coal, uranium and gas industries is expected to be offset by lower output of crude oil and condensate.

Significant turnaround in investment expected for 2001-02...

The forecast moderate rise in Australian mine production in 2001-02 reflects the lower levels of spending on exploration and investment in mining in recent years. Annual new capital expenditure on Australian mining projects fell by more than half in the two years to 1999-2000, to \$5.2 billion. In 2000-01, new capital expenditure remained flat.

However, based on the Australian Bureau of Statistics' latest survey undertaken in October–November, new capital expenditure in 2001-02 will recover sharply — by 60 per cent to \$8.4 billion. It appears that companies in Australia are committing to a number of large projects to take advantage of expectations of an improvement in world markets in the medium term.

Details of new minerals and energy development projects in Australia are contained in the article, 'Minerals and energy projects: major development proposals', appearing later in this issue of *Australian Commodities*. The article lists an extensive array of minerals and energy sector projects at advanced stages of planning and construction.

... however, improvement in exploration expenditure may be short lived

Minerals exploration in Australia also contracted sharply in the two years to 1999-2000; down by 32 per cent to \$1.4 billion. However, in 2001-02, minerals and energy exploration increased by over 26 per cent. Exploration expenditure for petroleum rose by 44 per cent to over \$1 billion in response to higher prices over the two year period to June 2001. For metallic and other minerals, exploration expenditure in 2000-01 increased by nearly 7 per cent to \$722 million.

With the outlook for oil and metal prices and global economic growth in 2002 significantly weaker since 11 September, the rate of increase in exploration expenditure in Australia shown in 2000-01 may not be sustained in the short term.

The subdued short term outlook for world economic growth and hence demand for minerals and energy commodities, falling real metals price trends, company decisions to rationalise their exploration capacities in recent years, and continuing problems with resource access in Australia, are likely to ensure that a sustained period of higher prices will be required before significant additional funding is attracted to minerals exploration in Australia.

Export earnings to reflect lower world prices

Reflecting sharply lower world prices for oil and metals more than offsetting higher minerals and metals export volumes, total earnings from Australia's minerals and energy exports are forecast to fall by just over 1 per cent to \$55.6 billion in 2001-02.

Within that total, earnings from exports of metals and related minerals are forecast to rise slightly to \$30.9 billion, while export earnings from energy commodities are forecast to fall — by 3.6 per cent to \$24.8 billion.

The weaker performance of the energy sector is the result of significantly lower earnings from the petroleum sector. Crude oil and refined petroleum products export earnings are forecast to be 24–30 per cent lower in 2001-02, while LNG earnings are forecast to be nearly 5 per cent lower. However, coal export earnings are forecast to be nearly 23 per cent higher as a result of increased export volumes and higher export prices following on from the negotiations with Japanese steel mills and power utilities in early 2001.

The slight rise in metal and related minerals industry export earnings in 2001-02 are mainly a result of forecast increases in export volumes (particularly for base metals) more than offsetting lower world metal prices. Similar to coal, iron ore export earnings are forecast to increase by over 13 per cent in 2001-02 because of higher export volumes and prices following favorable negotiations with Japanese steel mills in early 2001.

Oil and gas

Global growth in oil consumption to remain low

The outlook for global oil consumption growth in the short term is significantly weaker following the 11 September terrorist attacks in the United States.

The effect of the attacks has been to accelerate and deepen an already established decline in oil consumption growth caused by weakening world economic conditions and, until recently, sustained high oil prices. For the past six years, the annual average growth rate of global oil consumption was around 1.6 per cent. However, in August 2001, prior to the terrorist attacks, the twelve month moving average change in aggregate oil consumption growth for major OECD markets was just 0.1 per cent. In September, the moving average declined by 0.2 per cent, with the fall in demand being widespread across products and regions.

In the immediate wake of the terrorist attacks, one of the products most affected was jet fuel which, in 2000, accounted for around 8.5 per cent of OECD consumption. In response to the falloff in demand for global air travel, most major airlines cut both fleet capacity and flight schedules, resulting in a significant decline in demand for jet fuel, particularly in the United States. However, with declining industrial production in major western economies such as the United States and Japan, demand for other products, notably LPG, naphtha and fuel oil also fell.

Global oil consumption in 2001 is estimated to have grown by just 0.1 per cent.

In 2002, global oil consumption growth is forecast to be a little stronger, at 0.8 per cent, although still lacklustre in historical terms. The major factor underpinning this forecast is assumed weak economic activity in the key oil consuming economies in the first half of 2002, followed by a significant upturn in economic activity in the second half of the year. The increase in economic activity (and hence oil demand) is expected to be assisted by economic stimulus measures (already in place in the major western economies) and forecast lower world oil prices.

Collectively, OECD countries, which account for almost two-thirds of global oil consumption, are expected to show only marginal consumption growth in 2002.

Non-OECD countries are expected to contribute most to the forecast modest growth in global oil consumption. This is particularly the case for key developing countries such as China and India where economic growth is assumed to remain relatively strong in 2002.

Among OECD countries, oil consumption in Japan is expected to decline in 2002, in line with assumed negative economic growth for the year.

In north America, recent oil price falls have resulted in significantly lower petrol and diesel prices, boosting consumer demand for these fuels. Also, if recent long range weather forecasts (from the US National Oceanic and Atmospheric Administration agency) for this winter are realised, oil consumption in north America could be increased by relatively cold winter conditions causing an increase in demand for heating oil. However, these factors are expected to only ameliorate the effect on oil consumption of weak or falling demand for other products until the onset of economic recovery expected in the second half of 2002.

World oil production to increase

In early September 2001, OPEC members reduced their self imposed production quotas by a further 1 million barrels a day in response to easing oil prices. This brought total OPEC quota reductions for the year to 3.5 million barrels a day.

However, in the wake of the terrorist attacks in the United States in September, world oil consumption and prices fell sharply. As a result, OPEC members proposed further cuts in both OPEC and non-OPEC oil output.

The proposed further cuts to OPEC production (1.5 million barrels a day) were to be implemented from 1 January 2002 but were conditional on securing the agreement of some key non-OPEC producers such as the Russian Federation, Norway and Mexico to reduce their production by a combined 500 000 barrels a day. In early December, negotiations on non-OPEC intentions were continuing.

Non-OPEC output is estimated to have increased by 1.4 per cent, or 630 000 barrels a day, in 2001. The Russian Federation provided the bulk of this increase (an estimated additional 520 000 barrels a day). As a consequence and despite the cutback on quotas by OPEC, overall global production is estimated to have risen marginally in 2001 to 76.9 million barrels a day. OPEC's share of global production is estimated to have eased from 40 per cent in 2000 to 39.5 per cent in 2001.

While the outcome of OPEC members' recent proposals for production restraint in 2002 is uncertain, other factors suggest that global oil production in 2002 is likely to increase.

Earlier expectations of sustained high oil prices meant that many major international oil companies increased their investment in oil and gas production capacity in 2001, mainly in development projects in north Africa and north and south America.

Despite the subsequent sharp fall in oil prices and a significantly weaker oil demand and price outlook for 2002, this investment in new capacity is expected to result in production increases in these regions in 2002.

Also, the economies of some countries, both OPEC and non-OPEC, are heavily dependent on oil revenues and they may raise output in order to maintain revenue in the face of lower prices.

In 2002, global oil production is forecast to increase by 1.2 per cent to 77.8 million barrels a day.

Prices to fall in 2002

Immediately following the events of 11 September, crude oil prices rose because of fears of possible supply disruptions. The average price of WTI (West Texas Intermediate) oil peaked at US\$29.84 a barrel on 14 September. Average WTI prices then fell sharply, to US\$21.51 a barrel on 24

	Unit	1999	2000	2001 s	2002 f	% change
World						
Production	mbd	74.1	76.7	76.9	77.8	1.2
Consumption	mbd	75.3	75.9	76.0	76.6	0.8
Trade weighted crude oil price	US\$/bbl	17.46	27.50	23.04	17.00	-26.2
		1998	1999	2000	2001	
Australia		-99	-2000	-01 p	-02 f	
Crude oil and condensate						
Production	ML	27 898	37 447	38 705	37 404	-3.4
Exports	ML	14 291	20 877	24 030	23 199	-3.5
- value	A\$m	1 881	5 292	8 131	5 670	-30.3
Imports	ML	29 729	26 936	26 237	26 975	2.8
Natural gas						
Production	Gm ³	32.2	33.4	34.3	35.7	4.1
LNG exports	Mt	7.82	7.92	8.02	8.07	0.6
- value	A\$m	1 425	1 949	2 671	2 550	-4.5
LPG						
Production	ML	4 368	4 832	4 558	4 682	2.7
Exports	ML	2 486	2 857	2 785	3 252	16.8
- value	A\$m	297	648	830	681	-18.0
Petroleum products						
Refinery						
production	ML	42 944	43 499	43 490	44 024	1.2
Other	ML	6 138	6 580	6 641	6 483	-2.4
Exports	ML	4 236	4 116	4 577	4 674	2.1
Imports	ML	4 129	4 632	4 746	4 767	0.4
Consumption						
- total net	ML	48 974	50 650	50 012	50 500	1.0

See back tables for details. p Preliminary. s ABARE estimate. f ABARE forecast.

Oil and gas

In the wake of the global economic slowdown in 2001, world oil prices in 2002 are forecast to fall significantly



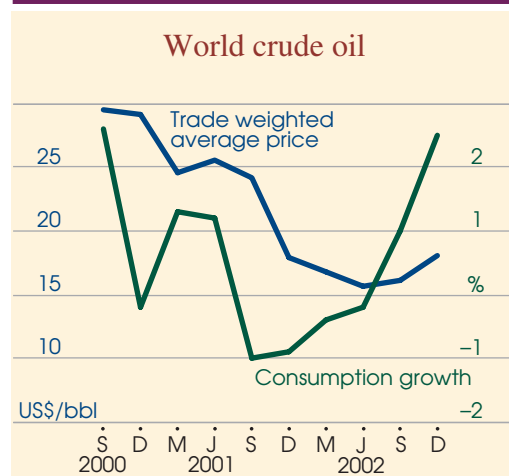
OPEC members are seeking cooperation from other producers to trim world output in 2002 in an effort to restore oil prices to their target band



While Australian production and exports of crude oil are expected to decline moderately in 2001-02, export earnings are forecast to fall sharply because of lower world oil prices



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September, as market concerns about deteriorating world economic conditions, and hence falling oil demand, took hold.

With world oil production continuing at previous levels, prices have since trended lower and in early December the average WTI price was around US\$19 a barrel. In average world trade weighted price terms this equates to around US\$17 a barrel. The estimated average world trade weighted price for the December quarter 2001 as a whole is US\$18 a barrel, 26 per cent below prices in the September quarter 2001 and 37 per cent below the average in the December quarter 2000.

Concerted action on production cutbacks to the extent proposed by OPEC members (2 million barrels a day) could have the effect of raising world oil prices significantly. In making this proposal, OPEC's declared aim is to restore prices (for a basket of OPEC crude oils) to within a target range of US\$22–28 a barrel. If successful, such action may have the effect of further reducing demand for crude oil, and hence contributing to a slower pace of world economic recovery than would be the case if prices were lower.

Apart from the imposition of production quotas, there are other influences on the oil market that are supportive of prices. These include an announced buildup of the US Strategic Petroleum Reserve (although the rate of the buildup is not expected to be rapid), and war premiums associated with possible future terrorist actions and military reactions. However, these factors are consid-

ered to be much less significant for prices than possible action to restrain supply.

There is one major market factor that is not supportive of price increases. Oil inventories in OECD countries grew consistently throughout 2001 because of weakening demand and are now relatively high. In terms of forward consumption, commercial OECD stocks were around 55 days supply at the end of the September quarter, up from an average of 52 days at the beginning of the year and considered to be sufficient to accommodate the traditional northern hemisphere winter seasonal peak demand.

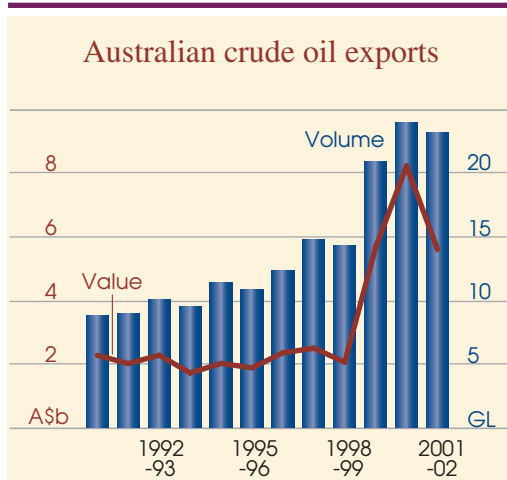
In the absence of any firm agreement and action on supply restraint, and in view of relatively high OECD commercial stocks, world crude oil prices are expected to remain weak for the next three quarters. Prices are expected to regain some ground toward the end of 2002 as oil consumption rises in line with an assumed pickup in world economic growth. The average world trade weighted price in 2002 is forecast to be US\$17 a barrel, 26 per cent down from average 2001 prices.

Australian production and exports easing; export earnings dropping

Despite a number of small but promising new finds around Australia's coastline, crude oil production is expected to be lower in 2001-02. This expected decline mainly reflects the declining productivity of the existing mature oil fields.

Australia's crude oil and condensate production is forecast to be 37 400 million litres in 2001-02, around 3.4 per cent less than the record production in 2000-01. The forecast decline in 2001-02 is largely the outcome of high output over the previous two years as production was brought on at a faster rate than originally planned, to take advantage of high oil prices.

Two new petroleum projects are expected to come on stream in mid-2002, at the end of the forecast period. The Laminaria phase 2 oil development in the Timor Sea is expected to contribute an additional 65 000 barrels of oil a day (3.8 billion litres a year) to the current 130 000 barrels a day from the Laminaria/Corallina fields. The expansion will accelerate production from existing reserves as well as providing access to



additional reserves. On the North West Shelf, the Echo/Yodel gas and condensate field is expected to produce 37 million barrels of condensate and 11.3 billion cubic metres of gas over a four to five year period. Both developments will contribute to production in 2002-03.

However, the additional oil and condensate production from these fields is expected to be more than offset by the expected continuing decline in productivity from existing mature fields.

In line with expected lower production, the volume of Australia's crude oil and condensate exports in 2001-02 is expected to fall, by 3.5 per cent to around 23.2 billion litres, from the record 24.0 billion litres in 2000-01. However, export earnings are set to fall sharply, mainly because of significantly lower world oil prices. The value of crude oil and condensate exports in 2001-02 is forecast to be \$5.67 billion, 30 per cent less than the record value of \$8.13 billion in 2000-01.

Mixed prospects for LNG developments

Construction of the North West Shelf Joint Venture's fourth LNG production train commenced in September and is expected to be completed in time to permit first deliveries of LNG by mid-2004. The capacity of the fourth LNG train is 4.2 million tonnes a year, which will bring total capacity at the facility to around 12 million tonnes a year. As with existing production, all of the additional output will be exported.

However, other longer term proposals to build a new LNG facility in Darwin and to

provide natural gas to eastern Australia are now in some doubt, with an alternative proposal to build a floating LNG production facility on site now also being considered by the joint venturers. Both proposals are based on Timor Sea gas from the Sunrise and Bayu/Undan fields. If the floating LNG proposal were to proceed, it would be the first of its kind in the world.

The North West Shelf partners have been invited to tender for a contract to supply 3 million tonnes a year of LNG over a twenty year period to China's Guangdong province. Other potential suppliers include six other operations in Asia and the Middle East. While this is illustrative of the potential demand for LNG in the Asia Pacific region, it also highlights the increasingly competitive nature of the industry.

Australia's LNG exports are expected to remain virtually steady in 2001-02 at just over 8 million tonnes. However, export earnings from LNG in 2001-02 are forecast to be 4.5 per cent lower, at \$2.55 billion. This is because of the forecast decline in oil prices, to which the LNG contracts are related. The implied fall in LNG contract prices is not as great as that for crude oil because the LNG pricing formula used moderates the effects of severe fluctuations in oil prices.

Gas pipeline activity increasing in south east Australia

While there is still some uncertainty about the major gas pipeline proposals in northern Australia — for example, the Papua New Guinea to Australia proposal that remains uncommitted — there are several new smaller pipeline projects in south east Australia either under construction, committed or in firm prospect. These developments are in response to growing demand for gas in the region.

The most advanced project is Duke Energy's Tasmanian Gas Pipeline, currently under construction and due for completion around mid-2002. The pipeline will stretch 753 kilometres from Longford in Victoria across Bass Strait and then onshore to Port Latta and Hobart, bringing gas to Tasmania for the first time.

BHP Petroleum and Esso are committed to building a 51 kilometre pipeline from the Bream oil and gas field to Longford. This

will be the fourth gas pipeline from Bass Strait fields. The development of the pipeline will allow the extraction of the Bream field's significant gas reserves. The pipeline is expected to be completed by mid-2003.

Other less advanced projects include two competing proposals to bring natural gas from fields in the offshore Otway Basin to Port Campbell in Victoria and on to South Australia. Both proposals are designed to alleviate potential gas shortages in the Adelaide market as production at the Cooper Basin declines. Another proposal to develop the Patricia/Baleen gas field in Bass Strait, if it proceeds, is likely to include a pipeline to Orbost, ultimately connecting with the eastern gas pipeline to Sydney.

Coal

Metallurgical coal trade to fall in 2002 ...

World trade in metallurgical coal is expected to fall in 2002, by 0.5 per cent to 191 million tonnes. This follows a similar small decline in 2001 and comes despite a modest forecast increase in world blast furnace steel production.

While world blast furnace steel output is forecast to rise in 2002 — by 0.5 per cent to 561 million tonnes — import demand in countries that import metallurgical coal is forecast to decline. In particular, Japanese blast furnace steel output is forecast to fall by 2 million tonnes in 2002 to 73 million tonnes, in response to lower exports of steel and steel intensive manufactured products and weaker domestic demand associated with a contraction in industrial production.

However, the impact on metallurgical coal trade of the fall in Japan's blast furnace output will be moderated by some substitution from imports of coke to imports of metallurgical coal. Before being fed into the blast furnace, metallurgical coal is treated in ovens to produce coke.

In 2001, Japanese blast furnace operators chose to increase imports of coke to reduce the burden on their own aging coke ovens. Lower forecast blast furnace output in Japan in 2002 is expected to reduce the incentive to undertake this practice, leading to an increase in the share of imported metallur-

gical coal in each tonne of blast furnace output.

Blast furnace output is forecast to increase in 2002 in other countries that import metallurgical coal, such as the Republic of Korea, Chinese Taipei and some nations in Europe. However, most of these gains are expected later in 2002 and will be more than offset by the forecast decline in Japan's import requirements.

The largest increase in blast furnace output is forecast to occur in China. However, as China has substantial domestic metallurgical coal reserves this is unlikely to have a significant impact on world metallurgical coal trade.

... but lower export capacity ...

The contribution of the United States and Canada to seaborne metallurgical coal trade fell in 2000 and 2001, as a result of mine closures and higher prices in the US market. For example, between January and July 2001, metallurgical coal exports from the United States and Canada to Japan and the European Union fell by 2.7 per cent compared with the same period in 2000. This occurred despite an increase in demand for coal imports by steel producers in these countries.

A shortfall in power generation capacity in the United States led to a significant increase in the prices for thermal coals. These increases were sufficient to divert coal previously exported for metallurgical applications to consumption in coal fired power stations in the United States.

While energy prices in the US market are expected to decline in 2002, combined metallurgical coal export capacity in the United States and Canada is not forecast to return to levels achieved in 2000 because of the closure of mines with depleted economic reserves and reduced international competitiveness.

Lower exports from Canada and the United States have benefited metallurgical coal exporters in other countries, particularly Australia. Exports of metallurgical coal from Australia rose by 9 per cent to almost 106 million tonnes in 2000-01. In 2001-02, Australian metallurgical coal exports are forecast to grow by only 2 per cent to 108 million tonnes, with lower demand from

Japan reducing the overall benefit of higher shares in most importing markets.

... will support prices

The reduction in metallurgical coal export capacity in Canada and the United States in 2001 placed upward pressure on prices through the year. Following the 8 per cent increase in hard coking coal contract prices achieved by Australian producers with Japanese steel mills in March 2001, prices have continued to rise. Negotiated prices with European and Brazilian buyers and recent spot deals have resulted in prices 6–21 per cent higher than the Japanese price settlement.

However, slowing world production of blast furnace steel and more intense use of semisoft metallurgical coal is expected to reduce this upward price pressure in 2002, particularly early in the year. Supply of semisoft coking coals (used to make weaker forms of coke, including thermal coals suitable for pulverised injection into blast furnace mills) is not as tight as for prime hard coking coals as there exists a more diverse range of suppliers of these types of coal, including producers in Australia, China and Indonesia.

On balance, relatively tight supply conditions are expected to support further modest increases in hard coking coal prices in markets where demand is increasing, particularly later in 2002. However, the outlook for prices due to be negotiated in Japan early

in 2002 is not as positive (see the boxed section on the following page). Further, prices for semisoft coking coals in all markets may come under downward pressure as a result of higher supply availability.

Thermal coal demand to keep rising in 2002 ...

World trade in thermal coal is estimated to have grown by 4 per cent in 2001 to 419 million tonnes. Slower growth in the world economy and falls in international oil and gas prices over the latter half of 2001 have moderated the growth in world thermal coal demand. This has been reinforced by increased use of petcoke for thermal purposes by cement manufacturers across Asia.

World thermal coal trade is forecast to grow by 5 per cent in 2002, to 440 million tonnes. Supporting trade in thermal coal will be the continued commissioning of new coal fired power generation capacity in Asia and forecast strong import growth in Europe and the United States.

In 2002 at least 8 gigawatts of new additional capacity is planned for Asia. Most of this will be commissioned in Japan, the Republic of Korea and Chinese Taipei and will require an estimated 17 million tonnes of coal imports. The recent announcements to expedite the closure of Japan's two remaining coal mines in 2002 will provide a further boost to coal trade next year of about 3 million tonnes.

	Unit	1999	2000	2001 s	2002 f	% change
Total world trade						
– metallurgical	Mt	179.6	192.5	192.0	191.0	– 0.5
– thermal	Mt	367.8	402.4	419.0	440.0	5.0
		1998	1999	2000	2001	
		-99	-2000	-01 p	-02 f	
Australia						
Production	Mt	225.0	239.3	257.8	267.1	3.6
Consumption	Mt	60.6	60.5	63.6	64.9	2.0
Exports	Mt	169.4	175.8	193.5	201.3	4.0
– metallurgical	Mt	85.3	96.8	105.5	107.6	2.0
– thermal	Mt	84.2	79.0	88.0	93.7	6.5
Export value	A\$m	9 239	8 297	10 799	13 256	22.8
– metallurgical	A\$m	5 472	5 184	6 596	7 853	19.1
– thermal	A\$m	3 767	3 114	4 202	5 402	28.6
Average export unit value						
– metallurgical	A\$/t	64.2	53.5	62.5	73.0	16.8
– thermal	A\$/t	44.8	39.4	47.8	57.7	20.7

See back tables for details. p Preliminary. s ABARE estimate. f ABARE forecast.

Coal

China's thermal coal exports continue to rise, placing competitive pressure on Australian exporters of thermal and semisoft metallurgical coal



Australian export returns are expected to grow strongly in 2001-02

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In Europe, coal imports are also expected to grow in 2002. The reduction of subsidies to domestic coal producers together with the introduction of competitive markets in fuel procurement for domestic power utilities has resulted in large cuts in domestic coal production in recent years, especially in the United Kingdom and Germany. In addition, a sharp fall in international bulk freight rates over the latter half of 2001 has led to an increase in the competitiveness of imported coals into the region.

Increased thermal coal imports into the United States in 2002, mainly from Colombia, will be sustained by US domestic requirements to burn lower sulfur coals.

... as Australia continues to face stiff competition from Chinese exporters

After growing by around 11 per cent in 2000-01 to 88 million tonnes, growth in Australian thermal coal exports in 2001-02 is forecast to

slow to 6.5 per cent, to reach almost 94 million tonnes.

Spot prices for thermal coal out of Newcastle have fallen over recent months from \$31.80 fob in early October to \$27.50 in late November. This is an indication that the large increase in thermal coal exports from China during 2001, to an estimated total of 77 million tonnes, is having a downward impact on international thermal coal prices.

China has, over 2001, attracted foreign investment, predominantly from Japan, that has allowed it to bolster its rail and port network and hence its export capacity. The completion of infrastructure, including the Shenchì-Huanghua railway (60 Mtpa) and the Huanghua port (40 million tonnes a year capacity), will provide a further boost to export capacity in 2002. These investments are part of the massive Shenhua coal project, with exports from this project expected to increase in 2002.

Leading economic indicators for Australia's contract coal prices

In a recent research project undertaken for the Department of Industry, Tourism and Resources, ABARE constructed four leading economic indicators for contract prices of Australian hard coking coal exports to Japan (see Hogan and Fainstein 2001 and, for more detailed documentation, Hogan, Fainstein and Copeland 2001). These leading indicators are to be updated and published on a regular basis by ABARE.

The leading indicators are derived from economic variables that are characterised by medium term or cyclical fluctuations that tend to lead those for contract coal prices over some historical time period. The cyclical behavior of hard coking coal prices is similar to that for contract prices of other major coal categories (semisoft coking and thermal coal) and Australia's coal export unit values. The leading indicators are therefore also likely to provide useful leading information for these prices.

There tends to be some historical variability in the lead relationship of each indicator with the contract hard coking coal price. The lead relationship may also change over time as coal pricing arrangements evolve. As a consequence, it should be

emphasised that the leading economic indicators need to be interpreted with caution and may only be regarded as providing broad signals of future price movements.

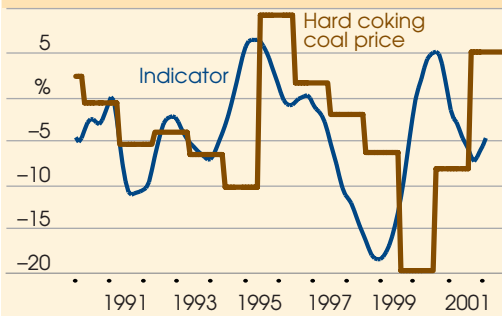
Overall, the leading economic indicators suggest real contract hard coking coal prices may have peaked in Japanese fiscal year (JFY) 2001-02 (April-March). In nominal US dollar terms, the indicators provide signals that the reference coal price may come under pressure in JFY2002-03 and may rise by around 2 per cent in JFY2003-04.

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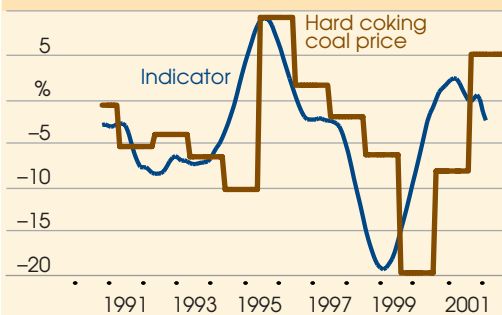
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Leading economic indicators for Australia's contract coal prices

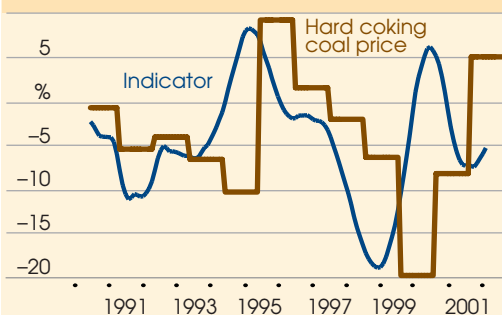
Medium term indicator (12 months)



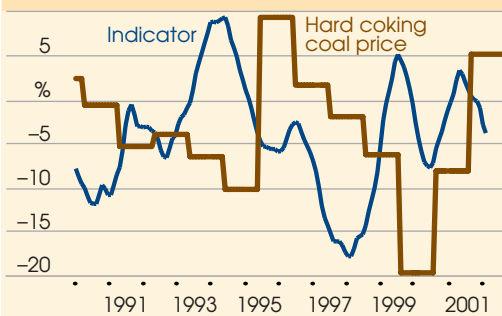
Short term indicator (6 months)



Medium term indicator (10 months)



Longer term indicator (21 months)



Longer time series

Annual percentage change (based on 2000 US\$/t)

- This leading indicator is based on world spot oil and other commodity price data since 1970. It leads the contract hard coking coal price on average by around 12 months.
- This indicator suggests that the contract hard coking coal price peaked in JFY2001-02 and may fall in JFY2002-03 by 6.8 per cent in real terms or 4.6 per cent in nominal terms.

Shorter time series

Annual percentage change (based on 2000 US\$/t)

- This leading indicator comprises spot coal prices, world spot oil and other commodity prices, industrial production in Japan and Australia's coking coal export stocks since 1989. It leads the reference coal price on average by around 6 months.
- A point forecast for the JFY 2002-03 year would be based on October 2001 for this indicator, which is not yet available. Based on September 2001 data, this indicator suggests the real reference coal price may fall by 2.3 per cent in JFY2002-03, representing a marginal fall in nominal terms.
- This leading indicator comprises world spot oil and other commodity prices, the OECD composite leading indicator for industrial production in Japan and Australia's coking coal export stocks since 1989. It leads the reference coal price on average by around 10 months.
- This indicator suggests that the reference coal price may fall in JFY2002-03 by 6.9 per cent in real terms or 4.7 per cent in nominal terms. This is similar to the price signals from the 12 month indicator.
- This leading indicator is based on Australia's coking coal export stocks since 1988. It leads the reference coal price on average by around 21 months.
- This indicator suggests that the reference coal price may fall in JFY2002-03 by 2.3 per cent in real terms or 0.1 per cent in nominal terms. This is similar to the price signals from the 6 month indicator.
- This indicator suggests the reference coal price in JFY2003-04 may fall by 0.9 per cent in real terms or rise by 1.8 per cent in nominal terms.

Such a rapid rise in coal exports from China has had some impact on Australia's market share in the Asian region, particularly as most of these exports have been directed toward Australia's traditional markets of Japan, Korea and Chinese Taipei.

The level of China's coal exports in 2002 is uncertain. Exports represent only a very small proportion of total coal production in China. Because of this, China has the capacity to act as a swing exporter, exporting coal when domestic prices are low and increasing the focus on supplying the domestic market when domestic prices increase. In the latter part of 2001 domestic demand for coal in China has increased strongly, as the economy continues to grow at a rapid rate relative to the rest of the Asian region. Nevertheless China appears to have sufficient capacity to at least maintain its current level of thermal coal exports.

The rapid rise in China's exports of thermal coal has added significantly to supply in the traded thermal coal market. To limit the downward impact that this could have on coal prices in 2002, some producers in New South Wales have announced that they will be closing their mines for extended periods over December-January and have indicated that temporary delays are being considered for expansion programs.

South African thermal coal exports are forecast to remain around 68 million tonnes in 2002, the same of estimated exports in 2001. This region lost significant market share to China in 2001, with exports to Asia estimated to have fallen by 38 per cent to about 9 million tonnes. Despite this, South Africa has been able to maintain exports by an increased focus on the European market, where it has a freight cost advantage over other competitors. Moderating exports from South Africa in 2002 is the announced closure of the Rietspruit mine.

Indonesian coal producers are forecast to increase exports to 64 million tonnes in 2002, from an estimated 63 million tonnes in 2001. Continuing political instability combined with labor unrest at some key mines may have raised concerns about supply security for key customers.

However, supporting growth of Indonesian coal exports is a trend toward increased use of sub-bituminous coals by

power generators in Korea, Chinese Taipei and the Philippines. The price of sub-bituminous coals has not risen as sharply as the price of hard thermal coals this year, leading to a more intensive use of this fuel by generators that are equipped to use it.

New projects ramp up for 2001-02 ...

Australian coal production is forecast to grow by 3.6 per cent in 2002 to 267 million tonnes. New projects on which construction will commence in 2002 include the Dartbrook expansion (4 million tonnes of capacity when complete), Beltana Longwall (6 million tonnes), and Glennies Creek Longwall (3 million tonnes) in New South Wales and the Millerman (3 million tonnes) project in Queensland.

Over 2001-02, Australian consumption of black coal is projected to rise by 2 per cent to 65 million tonnes. The recent commissioning of the Callide C power station in central Queensland will mean increased coal consumption in that state.

Australian export earnings keep rising

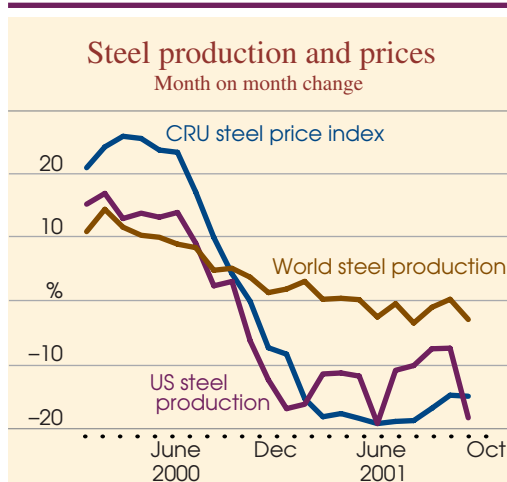
Total earnings are forecast to rise by nearly \$2.5 billion to around \$13.3 billion in 2001-02, confirming coal's standing as Australia's dominant export industry. In 2001-02 the rise in contracted coal prices negotiated earlier this year with Japanese consumers will be the main influence on higher export earnings, with increased export volumes contributing a lesser part. This follows the \$2.5 billion increase in earnings in 2000-01.

In 2001-02 metallurgical export earnings are expected to rise by 19 per cent to almost \$7.9 billion while thermal coal export earnings are expected to increase by 29 per cent to \$5.4 billion.

Iron ore and steel

Weakness in steel markets in 2001 ...

World crude steel consumption is estimated to have fallen by 27 million tonnes (or just over 3 per cent) to 818 million tonnes in 2001. This decline is broadly in line with an estimated contraction in industrial production in OECD economies of just over 2 per cent. Industrial activity was particularly weak in Japan and the United States, where



industrial production fell an estimated 7 per cent and 3 per cent respectively in 2001.

Despite the significant fall in consumption in 2001, world crude steel production fell by only 7 million tonnes to an estimated 838 million tonnes. Falls in production of 12 per cent in the United States and 3 per cent in both Japan and western Europe more than offset a rise in China's steel output of over 9 per cent. Cuts to production were highest in the United States, primarily because of an increase in competition from imports that was encouraged by the continued strength of the US dollar.

With the fall in world steel consumption exceeding the drop in production in 2001, stocks of most steel products rose and prices generally fell. The CRU steel price index (produced by London based commodity research agency, CRU International) that covers a range of steel products across major steel consuming regions declined by around 15 per cent in the year to early November 2001.

... to continue into 2002

With industrial activity in key steel consuming regions expected to remain weak in the first half of 2002, steel consumption is forecast to decline further early in the year. As a result, stocks are expected to continue to rise, exerting downward pressure on steel prices. Lower steel prices are expected to result in additional cuts to steel output in the first half of 2002.

Improving global economic conditions in the second half of 2002 are expected to lead

to a moderate recovery in world steel consumption. Growth in consumption is expected to allow stocks of steel held throughout the supply chain to fall. Lower steel inventories will support steel prices in the second half of 2002 and will encourage modest gains in steel production in most markets toward the end of the year.

Over the full course of the year, world steel output is forecast to rise by less than half a per cent to 841 million tonnes. The outlook for steel production in individual countries in 2002 will be affected mainly by differences in regional economic growth rates and alterations to market access arrangements.

Increases in regional industrial activity are expected to boost steel production in 2002 in all markets outside Japan and the United States. Japan's steel output is forecast to decline primarily as a result of weaker domestic demand associated with lower industrial production. US steel production is forecast to rise moderately in 2002, despite an assumed contraction in domestic industrial activity. US steel output will be supported by an increase in protective trade measures.

World steel and iron ore statistics

	1999	2000	2001	2002
	Mt	Mt	Mt	Mt
Steel production				
China	123.7	127.2	139.0	143.5
Chinese Taipei	15.4	16.7	17.1	17.7
Japan	94.2	106.4	103.0	99.0
Korea, Rep. of	41.0	43.1	43.5	44.0
United States	97.3	101.5	89.5	91.0
Western Europe	171.8	182.5	177.5	178.5
World	786.5	844.7	837.8	841.5
Iron ore imports				
China	53.3	70.0	92.0	101.0
Chinese Taipei	13.3	14.9	15.6	16.1
Japan	120.1	131.7	130.3	126.5
Korea, Rep. of	35.5	39.0	41.0	41.3
Western Europe	117.3	125.9	123.2	126.0
Iron ore exports				
Australia	139.3	157.4	158.5	162.0
Brazil	140.2	160.1	166.3	169.7
Seaborne trade	410.0	455.0	467.0	475.0

Higher trade barriers in the United States

The United States is the world's largest steel import market, importing around 34 million tonnes in 2000. Despite a fall in imports to an estimated 27 million tonnes in 2001, US steel mills have increased the number of claims that steel has been 'dumped' in the United States. That is, US steel producers and workers' unions have claimed that steel is being exported to the US market at prices lower than in the countries from which the steel is exported. In cases where there is no comparable market price in the country of origin, the export price is compared with the cost of production (with allowance for a profit margin) for the exporting company. If that company is operating in a nonmarket economy (where input prices may not reflect full costs), costs of production are estimated by referring to the costs of production in a third country.

It is argued that these imports have unfairly injured the US steel industry. As a result of marked declines in profitability, many US steel producers have closed capacity while thirteen have filed for 'chapter 11' protection from bankruptcy since 1998.

In response, the US International Trade Commission (USITC) undertook a 'section 201' investigation in late 2001 covering most categories of imported steel products. This section of US trade law allows the imposition of any trade barriers thought appropriate on imports from all sources of a product category found to have caused injury. This allows the possibility of trade barriers being imposed on individual exporters whose shipments did not cause injury.

In contrast, standard antidumping investigations are focused on one product and allow only for the imposition of a tariff on individual suppliers equivalent to the margin by which their exports are found to have been dumped.

In late October 2001, the USITC found that imports from categories that accounted for around 80 per cent of total US steel imports in 2000 did injure the domestic industry.

The USITC is due to recommend protective trade measures for each of those categories to the US President on 19 December

2001. The President is required to reply within 60 days (17 February 2002).

Foreign steel producers and governments have questioned the legality of this process under the trading rules of the World Trade Organisation and formal appeals are expected.

Irrespective of the mix of trade barriers (tariffs and quotas, for example) imposed, significant volumes of steel are expected to be diverted away from the US market. This will serve to increase the price, and therefore production, of steel in the United States while depressing steel prices and output in the rest of the world. Steel producers in the Russian Federation, South America and Asia are expected to be most affected, because of their generally higher reliance on exports to the US market.

However, relatively higher steel prices in the United States will also decrease the international competitiveness of US steel consuming industries, resulting in higher imports of steel intensive manufactured products than would otherwise be the case. This will provide some support to steel consumption and production in other countries.

In contrast to the United States, trade restrictions in the developing Chinese economy are expected to ease.

China joins the World Trade Organisation

The admission of China to the WTO on 11 December 2001 has important implications for world steel trade. China is already a large importer of higher value steel products and has become an increasingly important exporter of some lower quality steels. With a significant portion of China's steel making capacity being inefficient by world standards, the lifting of import restrictions will place pressure on domestic production.

In particular, exporters of the higher quality steel products (such as producers in Japan, Korea and western Europe) to China are expected to increase their share of the Chinese market. However, Chinese authorities are expected to take advantage of WTO regulations that allow tariffs to be imposed in some circumstances in order to maximise support to domestic steel producers in this transition period.

In further support of the domestic steel sector in the medium and longer term, membership of the WTO will increase access to foreign capital and technology, serving to modernise and increase the competitiveness of China's steel industry.

On balance, however, China's accession to the WTO is expected to result in a higher market share of steel imports in both the short and medium term. The benefits to China are expected to flow from access to lower priced steel by downstream sectors that, in turn, will contribute to higher economic growth.

WTO membership is also expected to lead to further liberalisation of China's iron ore market, underpinning continued increases in the share of imports in domestic consumption.

Iron ore trade higher in 2001 and 2002

Seaborne trade in iron ore is estimated to rise by 12 million tonnes to 467 million tonnes, in 2001, despite the fall in world steel production. Seaborne iron ore trade was supported by two factors in 2001: the regional distribution of cuts in steel production and the relative strength of blast furnace based steel output over production from electric arc furnaces.

The majority of the decline in steel output in 2001 occurred in markets that are not significant importers of iron ore, such as the

United States. While steel production did decline in the important iron ore import markets of Japan and western Europe, these falls were relatively minor and were more than offset by a significant increase in China's iron ore import requirements.

China's iron ore imports are estimated to rise by over 30 per cent (or 22 million tonnes) to 92 million tonnes in 2001, due to the combination of higher iron ore consumption and higher import penetration.

Further, despite the fall in total world steel production in 2001, output from iron ore dependent blast furnaces actually increased marginally (by just under 3 million tonnes to 561 million tonnes). There is a tendency for output from electric arc furnaces to be reduced first in the early stages of steel production cuts, as many steel producers have both types of facility and the profitability of electric arc furnaces is generally less dependant on maintaining high throughput rates.

Seaborne iron ore trade is forecast to rise by 8 million tonnes to 475 million tonnes in 2002, with a decrease in Japan's iron ore imports being more than offset by strong increases in China and moderate gains in other Asian countries and western Europe.

Despite the forecast increase in seaborne trade and limited prospects for increases in supply, downward pressure on iron ore prices is expected in 2002. In particular,

	Unit	1999	2000	2001 s	2002 f	% change
World production						
Iron ore	Mt	960	1 046	1 043	1 052	0.9
Steel	Mt	786	845	838	841	0.4
		1998	1999	2000	2001	
		-99	-2000	-01 p	-02 f	
Australia						
Production						
Iron ore	Mt	153.5	159.7	175.8	181.0	3.0
Iron and steel s	Mt	8.55	8.05	8.11	8.61	6.2
Manganese ore	kt	1 630	1 755	1 948	1 960	0.6
Exports						
Iron ore	Mt	135.2	149.4	157.3	164.5	4.6
– value	A\$m	3 844	3 779	4 901	5 559	13.4
Iron and steel	kt	3 332	2 941	2 513	3 114	23.9
– value	A\$m	1 316	1 268	1 277	1 332	4.3
Manganese ore s	kt	1 125	1 301	1 516	1 752	15.6
– value	A\$m	165	185	260	326	25.4
Price						
Iron ore	USc/dltu	29.92	26.63	27.79	28.98	4.3

See back tables for details. p Preliminary. s ABARE estimate. f ABARE forecast. Contact: Andrew Maurer + 61 2 6272 2134

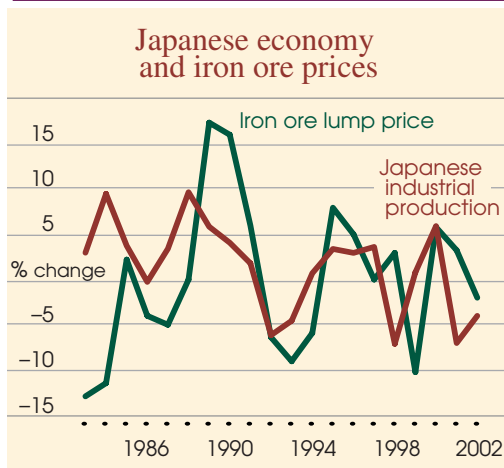
Iron ore and steel

Growth in world seaborne iron ore trade is forecast to exceed growth in total steel production in 2002



A lower exchange rate and higher world import demand is forecast to increase Australian export earnings to a record \$5.6 billion in 2001-02





weakening world demand for higher cost pellet and lump ore is expected to lead to modest price falls in the year ahead.

There is a high correlation between the strength of industrial production in Japan and iron ore prices. In each year that Japan's industrial activity has contracted over the past seventeen years, prices for iron ore lump have declined in the following year. Assumed falls in Japan's industrial production of 7 per cent in 2001-02 and 4 per cent in 2002-03 do not augur well for iron ore prices to 2003-04. However, the strength of this relationship is expected to weaken over time, in line with Japan's declining share of the world iron ore import market.

The outlook for prices of iron ore fines, however, is more positive. With both world demand and supply of iron ore fines expected to remain relatively flat in 2002, fines prices are forecast to be maintained close to current levels.

Australian iron ore exports to rise in 2001-02

The volume of Australian iron ore production is forecast to rise by just over 5 million tonnes to 181 million tonnes 2001-02. The increase in output is underpinned by a small increase in domestic consumption and significant growth in exports.

Australian iron ore consumption is forecast to increase by around 500 000 tonnes in 2001-02, with an increase in consumption for hot briquetted iron (HBI) production more than offsetting a decline in iron ore consumption by blast furnace facilities.

Iron ore exports from Australia are forecast to increase by nearly 5 per cent (or just over 7 million tonnes) to 164.5 million tonnes in 2001-02, facilitated by higher output and a drawdown in stock levels.

The increase in exports is forecast despite an expected decline in Australia's market share in China. Overall, Australian iron ore exporters have lost market share in China, as competing suppliers have been more willing to supply ore at higher discounts to world benchmark prices. Further, the competitiveness of some iron ore imports from Brazil that are 'backloaded' on ships transporting coal from China, along with an increasing Chinese financial interest in Brazil's iron ore sector has led to an increase in Brazil's market share at the expense of Australia. However, the strength in demand growth for iron ore imports by China is expected to be sufficient to underpin a rise in Australian exports to that market.

Higher Australian iron ore exports to China in combination with modest increases in deliveries to Korea and Chinese Taipei are forecast to more than offset a marginal decline in exports to Japan in 2001-02.

Total iron ore export earnings are forecast to rise by over 13 per cent in 2001-02, to \$5.6 billion, supported by the positive effects of an increase in volumes shipped, a lower average value of the Australian dollar and higher US dollar denominated prices previously negotiated for Japanese fiscal year 2001-02 (April 2001 to March 2002).

Higher Australian iron and steel output

Australian iron and steel production is forecast to rise by just over 6 per cent to 8.6 million tonnes in 2001-02, with an increase in HBI production more than offsetting a modest decline in steel output. Production of HBI from BHP's Boodarie facility in Western Australia is forecast to increase slowly toward capacity, while domestic steel production is expected to be negatively affected by reduced export demand.

Total exports from the sector are forecast to rise by nearly 24 per cent to 3.1 million tonnes in 2001-02, underpinned by the continued ramp up of the Boodarie HBI operation. However, the value of iron and steel exports is forecast to rise by around 4

per cent to over \$1.3 billion in 2001-02, as the average export price is forecast to fall as a result of lower international steel prices and a higher proportion of lower valued HBI in the export mix.

Nickel

Consumption to recover in 2002

World production of stainless steel (the main end use product for nickel) declined in 2001 in response to lower prices generated from rising stocks. Stainless steel stocks rose in the first half of 2001, as production levels were maintained despite declines in consumption. While global stainless steel production was lower in the second half of the year, stocks continued to rise as the output cuts were exceeded by a further reduction in consumption.

The negative impact of the contraction in stainless steel output on nickel consumption was somewhat offset by a decrease in the supply of stainless steel scrap (secondary nickel). The availability of scrap fell in 2001 as a result of lower prices for both primary and secondary nickel.

While the price of scrap follows a pattern similar to primary nickel prices, its availability is more sensitive to changes in price as the supply of scrap is a process of collection rather than of production. As a result, the ratio of primary nickel consumption


in the production of stainless steel rose in 2001.

Output of other nickel using applications (where secondary nickel tends to be less substitutable for primary nickel) also declined in 2001. In particular, reduced output of rechargeable batteries and super-alloys contributed to lower nickel consumption in 2001. As a result, world nickel consumption is estimated to fall by 78 000 tonnes in 2001, to 1.05 million tonnes.

Nickel consumption is expected to fall further in the first half of 2002, in line with the negative short term outlook for stainless steel production. Stainless steel output is expected to continue to decline in early 2002, in response to the lower prices in late 2001. However, these cuts in stainless steel production are expected to lead to a reduction in stocks that, in turn, will place upward pressure on stainless steel prices in mid-2002.

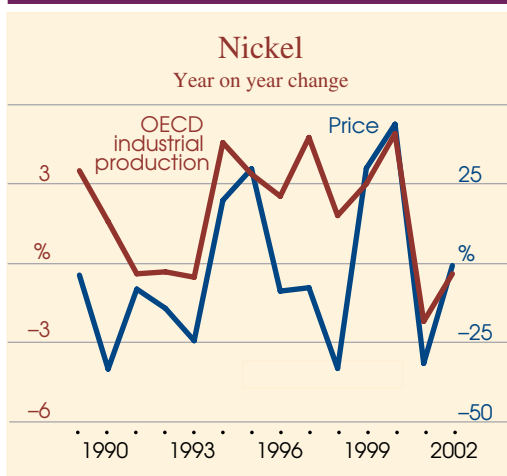
Stainless steel prices are expected to receive an additional boost later in 2002 from a recovery in stainless steel consumption associated with an assumed pickup in world economic activity. These higher prices are expected to encourage an increase in stainless steel production that would underpin a recovery in world nickel consumption in the second half of 2002.

However, the magnitude of the increase in primary nickel consumption will be tempered by a rise in the availability of

		Unit	1999	2000	2001 s	2002 f	% change	Nickel
World								
Production	kt	1 021	1 080	1 095	1 115	1.8		<i>Nickel consumption is forecast to rise in 2002, with an expected recovery in economic activity in the second half of the year</i>
Consumption	kt	1 083	1 128	1 050	1 105	5.2		
Closing stocks	kt	124	89	151	171	13.2		
– weeks of consumption		6.4	4.5	8.3	8.9	7.2		
Price	US\$/t	6 015	8 649	5 930	5 875	– 0.9		
	USc/lb	273	392	269	266	– 0.9		
Australia			1998	1999	2000	2001		 <i>The value of Australian nickel exports is forecast to fall in 2001-02, with lower US\$ prices offsetting the positive effects of increased export volumes and a lower A\$</i>
Production			–99	–2000	–01 p	–02 f		
Mine	kt	127	141	194	203	4.6		
Refined, class I	kt	69	89	108	123	13.9		
Refined, class II	kt	9	12	11	7	– 36.4		
Intermediate	kt	79	98	100	104	4.0		
Exports s	kt	151	177	187	210	12.3		
– value	A\$m	845	1 862	2 049	1 817	– 11.3		

See back tables for details. p Preliminary. s ABARE estimate. f ABARE forecast.

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stainless steel scrap in response to higher nickel prices. On balance, the strength of the recovery in end use markets is forecast to be sufficient to lift primary nickel consumption by 55 000 tonnes, to almost 1.11 million tonnes in 2002.

World nickel output continues to rise

World production of primary nickel is estimated to have risen by 15 000 tonnes to nearly 1.10 million tonnes in 2001, despite the fall in consumption. Nickel production rose as output increases from new production facilities more than offset cuts at other operations. Most of the announced nickel output cuts in 2001 were at higher cost ferronickel production facilities, including Pacific Metals operation in Japan and Falcondo's Banao facility in the Dominican Republic. Other cuts included the bringing forward of scheduled closure dates, as occurred with Outokumpu's Hitura operation in Finland.

Although the average nickel price is forecast to fall further in late 2001 and early 2002, it is not expected to be sufficiently low to prompt significant cuts to production. Substantial cuts to output have tended to occur in the past when prices remained below US\$4500 a tonne. Further, this trigger level is expected to be lower in 2002 than previously because of generally lower costs of production (mainly associated with efficiency improvements and reduced energy costs).

However, sustained prices of around \$5000 are expected to lead to some restraint

in production, possibly through the bringing forward of scheduled maintenance and by extended shutdowns over holidays. As a result, world nickel production is expected to fall modestly in the first half of 2002, before increasing later in the year in response to lower stocks and higher prices.

Current measures of stocks are assumed not to be an accurate reflection of actual stock levels as a significant quantity of 'unofficial' stocks is believed to exist. In particular, stocks of around 20 000 tonnes are believed to have been accumulated in the Russian Federation, as Norilsk Nickel has chosen to stockpile material rather than reduce production to match sales. These stocks are expected to be released into the market incrementally during 2002 to take advantage of higher prices, especially later in the year. This will constrain the upward movement of prices and reduce the incentive for nickel producers to increase output.

However, the forecast increase in consumption remains sufficient to underpin rises in both prices and production. As a result, world nickel output is forecast to rise by 20 000 tonnes to reach almost 1.12 million tonnes in 2002.

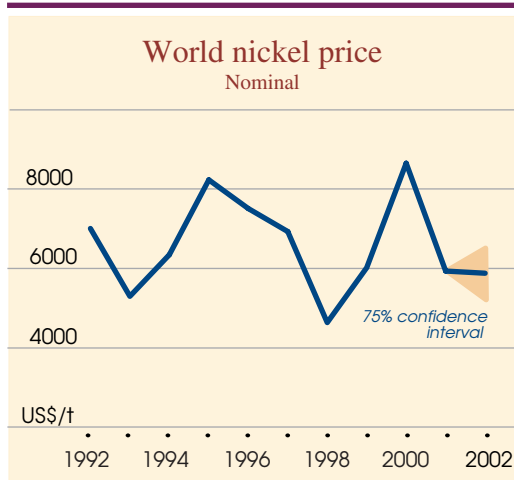
With nickel supply forecast to expand by a greater amount than consumption in 2001, there will be a rise in stocks. Combined London Metal Exchange and producer stocks are expected to rise from the equivalent of 8.3 weeks of western world consumption at the end of 2001 to 8.9 weeks of consumption by the end of 2002.

Prices higher in late 2002

Nickel prices are forecast to remain relatively low in the first half of 2002, in line with the expected weak demand from stainless steel producers associated with slower world economic growth.

Late in 2002, prices are forecast to firm, supported by expected increases in nickel demand associated with rising stainless steel production. Nickel prices rises will, however, continue to be constrained by the size of unofficial stocks (such as those held in the Russian Federation).

Over the full course of 2002, nickel prices on the LME are forecast to be marginally lower than the 2001 average, at US\$5875 a tonne (US\$266c/lb).



However, reflecting continuing market uncertainty about the timing of global economic recovery, and the historical volatility of the nickel and stainless steel markets, it is estimated that there is a 75 per cent probability of the average, 2002 price outcome being in the range US\$5200–6500 a tonne (US\$236–295c/lb).

Australian export earnings to fall

Australian nickel mine production is forecast to rise by 5 per cent to 203 000 tonnes in 2001-02, with increases in output from Murrin Murrin and some new and existing smaller operations more than offsetting decreases by Outokumpu, MacMahon Holdings and WMC.

Output from Outokumpu's Black Swan mine is decreasing as economic reserves are reaching exhaustion, while MacMahon Holdings' Blair mine closed in October 2001 in response to low nickel prices. While output from mines directly controlled by WMC is forecast to fall in 2001-02, higher output from mines formerly operated by the company are expected to rise. In particular, the ramping up of Mincor Resources' Miitel and Wannaway mines is expected to add an additional 6500 tonnes of nickel in concentrate to Australian mine output in 2001-02. A lower increase in production is expected from the more established Rav 8 mine operated by Tectonic Resources. All output from these mines is supplied to WMC for further processing.

LionOre Ltd commenced production at the Emily Ann project in Western Australia

in November 2001. All output from the 6700 tonne a year capacity mine will be shipped in concentrate form to Inco in Canada. Jubilee Mine's Cosmos operation is also expected to increase production in 2001-02, with all output also sold to Inco. The largest increase in mine output is expected at Murrin Murrin's nickel mine to allow higher production of metal from the company's refinery in 2001-02.

Australian production of nickel metal is forecast to rise by 10 per cent to 130 000 tonnes in 2001-02, underpinned by higher capacity utilisation at the Murrin Murrin and Bulong refineries. Despite the 7000 tonne increase in capacity of WMC's Kwinana nickel refinery in early 2001, output from the facility is expected to increase only marginally in 2001-02 as a result of low nickel prices. Output from BHP Billiton's Yabulu facility is expected to remain relatively flat in 2001-02.

Capacity utilisation at Anaconda Nickel's Murrin Murrin facility increased to 66 per cent in September quarter 2001, with production of 7467 tonnes of refined nickel. During the same period, production of nickel metal at Preston Resource's Bulong plant decreased marginally, to 1690 tonnes (equivalent to 75 per cent of capacity), as a result of technical difficulties.

As a result of the forecast increases in nickel output, Australian export volumes are forecast to rise by 12 per cent to 210 000 tonnes in 2001-02. Export earnings, however, are forecast to fall by 11 per cent to \$1.8 billion in 2001-02. The negative impact on



earnings of sharply lower prices is expected to exceed the positive effects of the forecast increase in volumes and a lower average value of the Australian dollar.

Aluminium and alumina

Prices to remain weak well into 2002

Aluminium prices to the end of November 2001 averaged US\$1451 a tonne (US\$66c/lb), significantly lower than the average price in 2000. Underlying recent price declines were dashed hopes of a modest recovery in US aggregate demand in the fourth quarter of 2001. Expectations of a US led global recovery vanished when a downturn in consumer confidence following the events of 11 September undermined an already weak US economy. In turn, the fundamentals of the aluminium market were tipped more firmly into the negative when the short term economic growth outlook in several other important consuming regions also deteriorated.

The fundamental weakness of the market has been illustrated by the sharp rise in London Metal Exchange stocks of around 420 000 tonnes in 2001 (an increase of around 130 per cent since the end of 2000). The current weakness in downstream demand for metal means that consumers are buying in thin volumes, thus maintaining higher levels of reported stocks held in warehouses. This has been reflected in recent trends in merchant premiums (amounts paid in excess of the prevailing spot aluminium price for warehoused material) for various classifications of primary aluminium, which have been squeezed in recent months.

The world aluminium market is expected to be significantly affected by the current cyclical downturn in the major consuming regions of the United States, east Asia and Europe. With little scope for a recovery in aluminium consumption over the next six months, and even less scope for further production cuts, prices are forecast to remain under pressure until at least mid-2002.

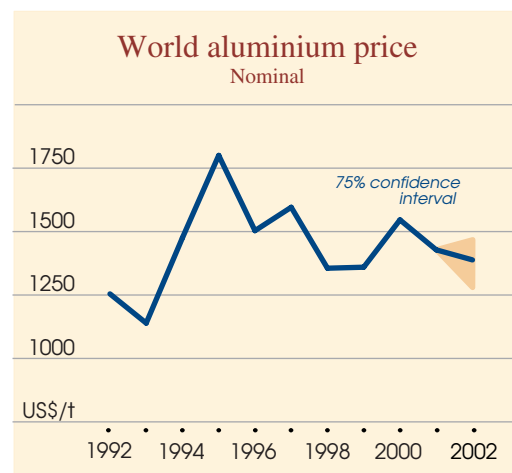
Stocks are expected to continue rising until a recovery in demand late in 2002 leads to a sustained restocking phase, and with it, significant consumption growth. For 2002 as a whole, it is expected that end of year visi-



ble stocks (LME and producer) will increase from an anticipated 5.0 weeks of consumption at the end of 2001, peaking at higher levels midway through the year before dropping back to around 5.2 weeks at the end of 2002.

The beginning of a consumer restocking cycle in the second half of 2002 is anticipated to be positive for prices, resulting in strong price rises toward the end of the year. However, for the whole of 2002, weak prices in the first two quarters are forecast to result in the average price of aluminium falling by around 2.8 per cent overall to US\$1390 a tonne (US\$63c/lb).

Given the range of uncertainties surrounding the timing of an anticipated demand recovery later in the year, as well as the importance of specific supply side developments, there is an estimated 75 per cent



probability that the LME spot price in 2002 will average between US\$1280 a tonne (US58c/lb) and US\$1470 a tonne (US67c/lb).

Demand to remain relatively flat

Aluminium demand, along with demand for the major base metals, has fallen in recent months amid ongoing economic weakness in the United States and Japan, and contractions in key consuming sectors in south east Asia and Europe. In 2001 as a whole, world aluminium consumption is estimated to have fallen by nearly 2 per cent compared with 2000, to around 24.6 million tonnes.

Although mill product orders in the United States appeared to stabilise toward the end of 2001, it is unlikely that this will signal any underlying growth in demand for primary metal in the near future. Steady falls in reported US producer stocks during the middle of 2001 indicate that rolling mills and extrusion plants are likely to be comfortably supplied with material in the near term. Furthermore, the construction sector — the mainstay of US aluminium consumption for most of 2001 — may decline as the number of building permits (a precursor to housing starts) recently fell to their lowest level in four years.

In Europe, there has been an accelerated decline in company sales volumes in the flat

rolled and extrusion markets over recent months. These developments indicate that European markets are entering the depth of their destocking cycle.

Meanwhile, the Japanese economy is expected to slip further into recession in 2002. Economic growth is forecast to contract by 1 per cent for the year, following an estimated 1.2 per cent contraction in 2001. Moreover, industrial production growth, a key indicator of primary metal demand, is assumed to fall by 4 per cent in 2002, with particular weakness in the domestic construction, transport and information technology sectors. This is expected to result in an overall decline in aluminium consumption in Japan of around 8 per cent in 2002.

In the rest of Asia (excluding China), a dependence on exports to currently depressed industrialised markets is expected to cause further weakness in economic growth in the region. Korea and Chinese Taipei have led the downturn, which has been accompanied by significant declines in aluminium consumption in both of these countries.

In 2002, a reprieve in the destocking cycle around the middle of the year is expected to trigger a modest recovery in aluminium consumption as downstream fabricators

	Unit	1999	2000	2001 s	2002 f	% change
World aluminium						
Production	kt	23 705	24 623	24 692	25 137	1.8
Consumption	kt	23 579	25 014	24 564	24 981	1.7
Closing stocks	kt	2 574	2 109	2 358	2 513	6.6
– weeks of consumption		5.7	4.4	5.0	5.2	4.0
Price	US\$/t	1 361	1 549	1 430	1 390	–2.8
	USc/lb	61.7	70.3	64.9	63.0	–2.9
World alumina						
Spot price	US\$/t	205	314	148	157	6.1
		1998	1999	2000	2001	
		-99	-2000	-01 p	-02 f	
Australia						
Production						
Bauxite	Mt	46.4	51.0	54.6	54.3	–0.5
Alumina	kt	14 207	15 037	16 098	16 400	1.9
Aluminium	kt	1 686	1 742	1 788	1 822	1.9
Exports						
Alumina	kt	11 059	11 654	12 721	12 993	2.1
– value	A\$m	2 910	3 471	4 507	3 904	–13.4
Aluminium	kt	1 365	1 364	1 471	1 479	0.5
– value	A\$m	2 840	3 302	4 229	3 804	–10.0

See back tables for details. p Preliminary. s ABARE estimate. f ABARE forecast.

Aluminium

Aluminium consumption is expected to remain flat for most of 2002, but a modest rise in demand later in the year is expected to contribute to consumer restocking, thereby supporting prices



Despite relatively strong production, lower world prices are forecast to result in Australia's total earnings from exports of aluminium and alumina falling significantly in 2001-02

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adjust their inventories in anticipation of export growth.

The Chinese economy has proved to be resilient over the past twelve months, growing by an estimated 7.3 per cent, with industrial production growth of nearly 10 per cent. In 2002, the strength of domestic demand is expected to be only partially offset by softer growth in exports.

Aluminium consumption in China is expected to increase further over the next two years as a result of a recent announcement by state officials that work will soon commence on the second phase of the rural power transmission program — the initiative undertaken to upgrade China's low voltage power transmission networks. The announcement follows the recent completion of phase 1 of the program, which required consumption of an estimated 700 000 tonnes of aluminium.

Overall, world aluminium consumption in 2002 is expected to increase by 1.7 per cent to almost 25 million tonnes, driven by the continuing strength in Chinese demand as well as an anticipated end to destocking in the United States, east Asia (excluding Japan) and Europe later in the year.

World production developments

On the supply side of the market, month on month world production rates have stabilised as curtailments related to the cost and availability of electricity in the Americas have been balanced by production growth in China and the Russian Federation.

Production in 2001 as a whole is estimated to have been largely unchanged from the previous year, at around 24.7 million tonnes.

There have been minor declines in production in some regions in recent months as a result of industrial action (BHP Billiton's Mozal smelter in Mozambique) and power disruptions (Comalco's Tiwai Point facility in New Zealand and BHP Billiton's Hillside smelter in South Africa), but overall production has leveled out, ending successive monthly declines in middle to late 2001 in the wake of major capacity closures. As expected, substantial production increases in China and a modest rise in the Russian Federation have offset falls in other parts of the world.

In the United States, most of the 1.6 million tonnes of idled capacity in the Pacific Northwest region is expected to remain offline during 2002. Despite wholesale power prices returning to 'normal' levels toward the end of 2001, the currently depressed market environment and soft price outlook in the short term is likely to prevent any significant restarts in the region.

A review of typical operating costs for smelters in the Pacific Northwest region indicates that, given current prices and uncertainty, the costs of production per tonne of aluminium would leave companies favoring a continuation of idling production capacity (see the table below). Furthermore, in deciding to restart idled capacity that has been dormant for some time, producers face significant overhead costs in terms of refreshing and rebuilding potlines in preparation for electrochemical smelting — casting further doubt over the possibility of production resuming in the US Pacific Northwest while prices remain weak.

In addition, the situation of power restrictions affecting aluminium production in Brazil has changed little recently, despite the government signaling that it will consider reducing power rationing requirements for households. Industrial users (including aluminium smelters) are expected to maintain power rationing cuts in the vicinity of 15–25 per cent for at least the first half of 2002. This is expected to mean the continued idling of around 300 000 tonnes of annual smelting capacity in Brazil — equivalent to around 24 per cent of Brazil's production in 2000.

US Pacific Northwest smelting costs

	Cost per tonne of aluminium metal
	US\$
Alumina (@ \$150/t)	290
Electricity (@ \$36.50/MWh)	584
Labor	240
Other	190
Total	1 304
Spot aluminium price	1 276
(ABARE December quarter estimate)	

The continuation of power related production curtailments in the United States and Brazil has partly reduced the impact of demand weakness in the aluminium market. However, given that market participants have already factored these developments into the market's dynamics, the improbability of further production cuts elsewhere means that the supply side is expected to be a neutral to negative influence on aluminium prices in the short term.

Eastern producers make up for western world production declines

In attempting to deal with challenging market conditions, many aluminium producers are implementing restructuring and cost cutting measures to improve operating margins. One such company with a dominant presence in the world market is Russian Aluminium, which recently reduced staff and wages and reevaluated their medium term investment program.

In the first three quarters of 2001, total aluminium production in the Russian Federation is estimated to have increased by almost 2 per cent, year on year, to around 2.47 million tonnes. However, reported Russian exports fell by nearly 5 per cent, to an estimated 2.30 million tonnes over the same period. The reported data imply that either there has been a substantial increase in Russian aluminium consumption, or there has been a significant buildup in producer stocks.

Recent announcements by Russian Aluminium indicate that some of the increase is being absorbed by higher domestic consumption. The company is expecting results to confirm an increase in output from its domestic downstream operations of over 22 per cent for the whole of 2001.

In 2002, the Russian Federation is expected to remain a large exporter of primary metal. The possibility of a reduction in aluminium export duties in early 2002 is expected to provide an incentive for producers to offload accumulated stocks.

Another major producer, China's Chinalco, has entered a strategic agreement whereby Alcoa holds a sizable equity interest through investment in the initial public offering of Chalco (the name of the newly listed entity). This effectively opens the way

for Alcoa and Chalco to progress with a 50:50 joint venture to expand China's Pingguo alumina refinery and aluminium smelter in the near future, to rates comparable with large western facilities. The deal draws a parallel between investment in emerging regions and the current power related curtailments in established producing regions, and highlights a desire within the industry to focus on longer term objectives such as investing in production capacity where potential cost advantages exist.

In the short term, aluminium capacity in China is expected to continue growing strongly, following an estimated 650 000 tonne annual capacity increase in 2001. Production in China is forecast to increase by nearly 7 per cent in 2002, to around 3.6 million tonnes.

Overall, total world production in 2002 is forecast to increase by 1.8 per cent to around 25.1 million tonnes.

Alumina prices uncertain

While aluminium production has been relatively flat in 2001, alumina capacity has continued to grow. World alumina capacity has been pushed higher by a 600 000 tonne expansion at India's Damanjodi refinery, and ongoing refinery upgrades in China. As a result, the average refinery operating rate required to balance the market (based on alumina requirements for aluminium production) has fallen to an estimated 90 per cent from around 95 per cent in 2000.

However, substantial production cuts at a number of refineries in north and Latin America have partly eased supply pressures in the market. Alcoa has suspended operations at the 600 000 tonne a year St Croix refinery in the Virgin Islands, as well as reducing output at its 2.3 million tonne a year Point Comfort refinery in Texas by 70 per cent.

In Brazil, BHP Billiton has announced that output at its Alumar refinery fell by around 26 per cent in the third quarter 2001 because of power rationing, with further declines likely.

As would be expected, there have been variations between regions in refinery operating rates owing to lower aluminium production in the Americas and stronger output in China and the Russian Federation.

Australian producers have been well placed to take advantage of the recent strength in Chinese demand, with price quotes for Australian material holding up at around US\$135–145 a tonne fob, compared with Caribbean material at around US\$120 a tonne fob recently.

In the near term, it is anticipated that quotes for Australian material may come under pressure because of import controls imposed by Chinese authorities. Concerns have been raised about new compliance rules introduced by the Chinese State Economic and Trade Commission requiring all alumina shipments to be registered and approved. Given that China buys a significant portion of its alumina imports on the spot market, it is likely that these new rules are already influencing the market, with China's alumina imports for October having fallen by around 50 per cent month on month.

Overall, spot alumina prices are expected to decline marginally over the next six months, as demand continues to fall. Further into 2002, considerable uncertainty emerges as American refineries assess their operating strategies and Chinese smelters run down stocks. Toward the end of 2002 alumina prices are anticipated to rise sharply at the earliest signs of any pickup in aluminium demand. The spot alumina price as a percentage of the LME aluminium price is expected to increase from around 10 per cent currently, to over 11 per cent of the aluminium spot price. As a result, the average spot price of alumina in 2002 is forecast to increase by around 6 per cent, to US\$157 a tonne, from the exceptionally low levels of 2001.

Australian producers to maintain strong output ...

Australian production and export volumes for both aluminium and alumina have remained resilient over recent months, aided by a competitive Australian dollar and favorable operating margins at local refineries and smelters.

The robust performance of Australia's aluminium sector so far this financial year has been impressive considering the challenging market environment facing the industry at present.

A likely explanation for the recent strength in aluminium and alumina output is that there has been a concerted effort by specific companies to focus on the efficiency and returns of their operations while evaluating potential future growth options.

In the short term, many Australian facilities are expected to operate at highly competitive margins, with export oriented production to be aided by a favorably positioned Australian dollar.

Aluminium production in Australia is expected to increase to around 1.82 million tonnes, while alumina production is forecast to be around 16.4 million tonnes in 2001-02 — year on year increases of 1.9 per cent for both commodities.

... but export values to fall

Despite the continuing strength of Australia's production and export volumes from aluminium and alumina, markedly lower world prices have begun to push the value of exports down.

Lower prices are expected to have a significant impact on export returns in the remainder of 2001-02, with combined export earnings for aluminium and alumina forecast to decline by 12 per cent to just over \$7.7 billion. This expected fall follows a record 29 per cent increase in combined earnings in 2000-01, the cumulative result of a lower Australian dollar, increased export volumes and high world alumina prices during the period.

Individually, it is expected that aluminium export volumes will increase marginally in 2001-02, to 1.48 million tonnes. However, earnings from aluminium exports are forecast to fall by 10 per cent in 2001-02, to \$3.8 billion, mostly as a result of the sharp downturn in prices.

Export volumes for alumina are forecast to increase by 2 per cent, to almost 13 million tonnes in 2001-02. Nevertheless, earnings from alumina exports are forecast to fall by over 13 per cent to \$3.9 billion in 2001-02, because of significantly lower prices resulting from uncertainty in the Asian export market.



Gold

Prices return to pre-terrorist attack levels

In the wake of the terrorist attacks in the United States on 11 September, the price of gold increased substantially, reaching a high of US\$293 an ounce, testing gold's role as a safe haven asset. However, the rally in gold prices was not sustained, with the price returning to a narrow range of US\$270–280 an ounce by November.

For 2001 as a whole, prices are estimated to average around US\$270 an ounce and are then forecast to firm to average US\$275 an ounce in 2002. Reflecting the large range of uncertainties in the global economy, it is estimated that there is a 75 per cent probability that the average gold price in 2002 will lie in the range US\$260–280 an ounce.


Global economic health key to gold price

The health of the global economy is currently the most important factor influencing the path of the gold price over the next year. It is expected that the global economic slowdown will continue into 2002, with a recovery expected in 2003.

London AM fix gold price trading range, 2001

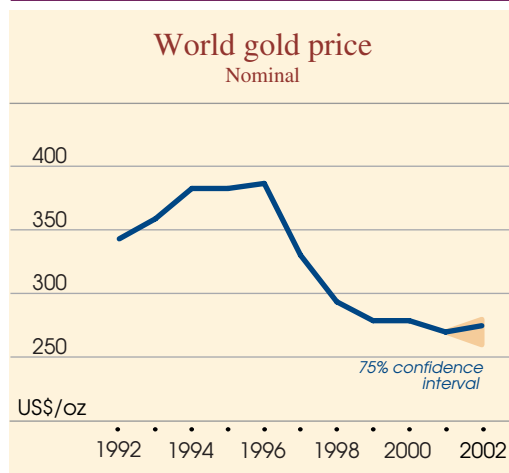


Related to the strength of the global economy is fabrication demand for gold. Total fabrication consumption for the first three quarters of 2001 was 2356 tonnes, according to figures released by the World Gold Council in their November *Gold Demand Trends* report. This represents a 2 per cent fall on the same period in 2000. However, a reduction in net additions to supply, through stable official sector sales and private disinvestment levels during 2001 has offset the impact that this fall has had on the price of gold.

	Unit	1999	2000	2001 s	2002 f	% change	Gold
World							<i>The average world gold price is forecast to rise in 2002, as reduced attractiveness of producer forward gold sales, stable official sector sales and lower world production offset uncertain global economic conditions and reduced fabrication consumption</i>
Fabrication consumption	t	3 744	3 739	3 610	3 522	- 2.4	
Mine production	t	2 570	2 573	2 550	2 515	- 1.4	
Scrap sales		616	611	650	660	1.5	
Residual net stock							
sales (purchases)	t	558	555	410	347	- 15.4	
Official sector	t	464	471	487	490	0.6	
Private sector	t	(412)	94	(46)	(293)		
Producer hedging	t	506	(10)	(31)	150		
Price	US\$/oz	279	279	271	275	1.5	
		1998 -99	1999 -2000	2000 -01 p	2001 -02 f		 <i>Australian export earnings from gold are forecast to rise strongly in 2001-02</i>
Australia							
Mine production	t	303	299	298	288	- 3.4	
Exports	t	421	330	302	353	16.9	
Australian origin	t	299	264	257	293	14.0	
Overseas origin	t	122	65	45	60	33.3	
Total	A\$m	6 317	4 803	4 887	5 464	11.8	
Price	A\$/oz	457	448	501	516	3.1	
See back tables for details. p Preliminary. s ABARE estimate. f ABARE forecast.							Contact: Anthony Simms + 61 2 6272 2403

See back tables for details. p Preliminary. s ABARE estimate. f ABARE forecast.

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In 2002 the underlying global demand for fabricated gold products (of which jewellery accounts for 86 per cent) is expected to be lower, in line with the current downward revisions to world economic growth rates. As a result, fabrication consumption is forecast to fall by 2.4 per cent to 3522 tonnes in 2002. This forecast decline in fabrication consumption will have a negative influence on the gold price over 2002. The extent of this decline will depend, however, on how severely worldwide consumer confidence is affected in the wake of the terrorist attacks in the United States and the current economic slowdown.

Unlike fabrication demand, investment demand rose in the wake of the global uncertainty caused by the terrorist attacks. In the third quarter of 2001, investment demand was 105.9 tonnes, 17 per cent higher than in the same quarter a year earlier. This increase in investment demand was predominantly 'safe haven' buying in several countries including the United States, Japan and the Republic of Korea after the September terrorist attacks. The issue of the commemorative deutschemark gold coin in Germany early in the third quarter also helped to boost investment demand.

Supply outlook steady

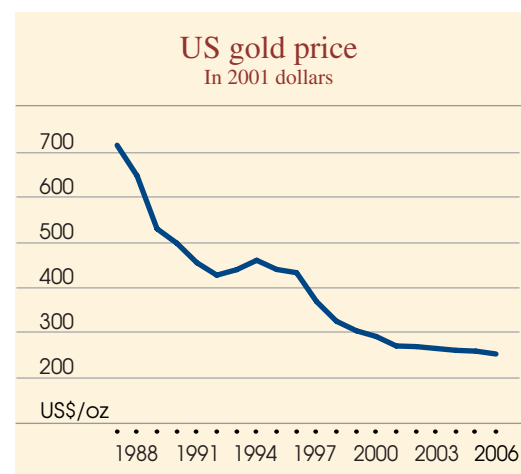
In the midst of the turmoil that prevailed in September, the Washington agreement on central bank gold sales reached its second anniversary. As a result of this agreement, net official sector gold sales have remained a predictable feature of the market, with

members of the agreement adhering closely to their self imposed limit of 400 tonnes of combined annual sales.

In the Gold Fields Mineral Services *Gold Survey 2001 Update 1* it was estimated that net official sector gold sales for 2001 would increase by around 3.4 per cent year on year to 487 tonnes. In 2002 net official gold sales are forecast to remain steady at around 490 tonnes.

In August last year, the World Gold Council noted in its report on gold derivatives that the new supply to the market from official sector lending after the Washington agreement was between 560 and 1000 tonnes a year. This implied that nonsignatories to the Washington agreement had been providing net additions of between 160 and 600 tonnes of gold a year to the market. According to the latest figures released by the World Gold Council, new sales and lending of gold from central banks that are not signatories to the Washington agreement are expected to be much lower than these figures, at around 90 tonnes.

Official sector sales will remain low for two main reasons — reduced demand and the fact that non-Washington agreement signatories are already lending nearly half of their holdings on average, compared with signatories lending around 14 per cent of holdings. Gold Fields Mineral Services has estimated that 54 tonnes of non-Washington agreement gold was sold in the first half of 2001 and expects only 16 tonnes of gold to have been sold by nonsignatories in the second half of 2001.



World gold mine production is forecast to fall by 1.4 per cent in 2002 from levels estimated for 2001. This downward trend in gold mine production has been evident for several years. However, it is generally not regarded as being large enough to affect short term price movements. This downward trend in global mine production is expected to accelerate in the future as real gold prices and exploration expenditure continue to fall.

Narrowing contango supports price

The narrowing of the 'contango' received by gold producers is an important factor supporting the price of gold. The contango is the premium of forward prices over spot prices.

The dramatic reductions in interest rates that have occurred this year in an attempt to resuscitate the global economy, combined with increasing gold borrowing costs (lease rates), have squeezed the contango, making the forward sale of gold unattractive for many producers. The impact of this reduction in the contango is estimated to be a net reduction in producer hedging of 31 tonnes in 2001. The impact of this reduction is positive for price because it reduces the supply of gold available to the market, as producers allow contracts to expire without replacing them or actively close out their hedging positions.

The supply of scrap gold is estimated to have increased by over 6 per cent in 2001 to 650 tonnes and is forecast to increase by a further 1.5 per cent in 2002 to 660 tonnes. These increases are in line with forecasts of slightly firmer prices combined with reductions in economic growth rates.

The combination of a reduction in mine supply, reduced fabrication demand and an expected weakening of the US dollar will affect the short term gold price outlook. The weakening of the US dollar is expected to be the dominant influence on the gold price in the March quarter 2002. Demand for gold is expected to pick up in that quarter, as the US dollar weakens.

As gold is a US dollar denominated commodity, a weakening of the US dollar makes gold cheaper in other countries — including in India and east Asia which together account for around 40 per cent of

world fabrication consumption — thus placing pressure on the US dollar denominated gold price to rise.

In the March quarter 2002, gold is forecast to average US\$282 an ounce. For the remainder of 2002 the gold price is expected to be lower, at around US\$272–274 an ounce, owing to reductions in fabrication demand outweighing the benefits of a weaker US dollar. The reductions in fabrication demand (primarily for jewellery and electronics) are expected to be caused by the forecast low levels of economic growth and consumer confidence.

Australian mine production lower ...

Australian gold production is forecast to fall by 3.4 per cent in 2001-02, to 288 tonnes. This reduction is primarily the result of the processing of lower grade ore in a number of operations, and older mines coming to the end of their mine life. These mines include Mount Charlotte, Fortnum and Kidston.

Domestic production in the September quarter this year was an estimated 69.6 tonnes, 4.2 tonnes lower than in the June quarter. Production in the December quarter is expected to increase by 3.7 per cent to 72.3 tonnes.

... but export earnings to rise

Although gold production is forecast to fall over 2001-02, the volume of gold exports of Australian and overseas origin is forecast to increase by 17 per cent to 353 tonnes. This increase in export volume is expected to result from a 33 per cent increase in gold from overseas origin, primarily from south east Asia, and a 14 per cent increase in Australian origin gold exports to 293 tonnes. Exports of Australian origin gold will be higher in 2001-02 than actual mine production because of lags in the production, refining and export system. As a result of the higher export volume and Australian dollar price of gold, the total value of gold exports is expected to increase by nearly 12 per cent to \$5.46 billion.



Copper

Average world copper prices to fall ...

World copper prices are estimated to have fallen by 13 per cent in 2001 to average US\$1580 a tonne (US72c/lb).

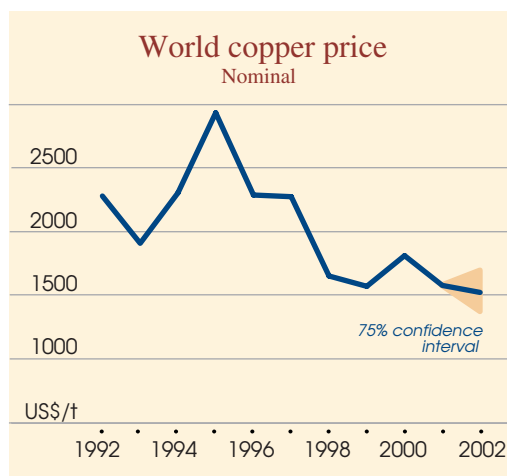
Deteriorating global demand conditions have been evident throughout 2001, with the United States, western Europe and Asia (with the exception of China) all exhibiting slowing rates of economic and industrial production growth.

In 2001, declining world copper demand together with rising mine and refinery supplies resulted in strong rises in official stocks. As a consequence, prices fell during the year to record lows in real terms, prompting production cuts from some major producers.

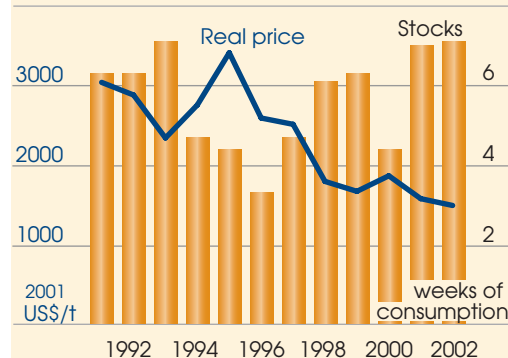
Looking ahead, the two key influences on copper prices in 2002 are expected to be the strength and timing of economic recovery in United States (and associated flow-on effects to demand in the rest of the world), together with the size of further cuts to world production.

Copper prices are forecast to remain subdued in the first half of 2002, ahead of a recovery in economic and industrial production growth in the second half of the year. For 2002 as a whole the average price of copper is forecast to fall by 3.5 per cent to US\$1525 a tonne (US69c/lb).

Reflecting uncertainties about the strength and timing of economic recovery in the United States and the size of further cuts



Copper stocks and prices



to world production, the average 2002 copper price is forecast to have a 75 per cent probability of being in the range US\$1380–1690 a tonne (US63–77c/lb).

With lower consumption relative to production, western world stocks of copper have risen strongly in 2001, and are expected to be around 7 weeks of consumption by the end of the year.

In 2002, the likelihood of further production cuts in the first half and stronger world consumption growth in the second half are expected to result in a slower rate of increase in official stocks. Stocks are forecast rise moderately to end the year to around 7.1 weeks of consumption.

World production growth to slow

World copper mine supply is estimated to have grown by 2.9 per cent in 2001, to 13.65 million tonnes. In 2002, mine production is forecast to grow more slowly — by 1.7 per cent — to 13.89 million tonnes for the year.

With lower copper prices adversely affecting the profitability of many mining operations, the rate of new mine production increases has slowed.

As a consequence, the main increases in world mine production in 2002 are expected to come from two new mines and one mine expansion, all in south America. These are the Antamina copper/zinc mine in Peru, with a capacity of 272 000 tonnes a year of contained copper; and the El Tesoro facility in Chile, with a capacity of 75 000 tonnes of SX-EW (solvent extraction – electrowinning) cathode. Both mines began operations in

mid-2001. In addition, BHP Billiton's Escondida Phase IV expansion in Chile is expected to begin production in September 2002, at an average rate of 400 000 tonnes of contained copper a year.

However, increases in world mine production in 2002 will be partly offset by some major capacity closures announced in late 2001. These include closures at some high cost Phelps Dodge operations in the United States. Phelps Dodge plans to extend temporary closures at its Chino and Miami operations and to operate its Sierrita and Bagdad mines at half capacity in 2002. This is expected to result in the loss of 220 000 tonnes of copper for the year, and follows cuts of around 80 000 tonnes made by Phelps Dodge in 2001, as a result of cost pressures.

BHP Billiton also announced major production cuts in November. Copper production is to be cut by 17 per cent, with production at the Escondida and Tintaya operations in south America to be temporarily reduced by 80 000 and 90 000 tonnes respectively in 2002 by a process of low grading. This will occur prior to the expansion of Escondida referred to earlier.

In addition, Codelco, the world's largest copper producer, has signaled its intention to cut output by 100 000 tonnes from its Chilean operations in 2002.

Interestingly, the production cuts announced by BHP Billiton and Codelco are planned to be achieved through processing

lower grade ores, rather than by lower throughput or facility closures. This is expected to allow a faster return to full capacity when market conditions improve.

In addition, Antofagasta announced that copper production at its new Los Pelambres mine in Chile will be 40 000 tonnes lower in 2002 because of lower ore grades. Antofagasta has also announced that a planned expansion of Los Pelambres will be deferred pending improved market conditions.


Further cuts to copper mine supply are expected, with Grupo Mexico considered to be likely to make significant cuts at its high cost US operations early in 2002.

World refined metal supply is estimated to have risen by 3.5 per cent in 2001 to 15.36 million tonnes. However, in 2002, metal production is forecast to rise by 0.7 per cent, to 15.47 million tonnes for the year.

With little new refining capacity coming on stream in 2002, the most significant increases in refined production are forecast to come from Chile, where new production of 75 000 tonnes of cathode is expected from the El Tesoro SX-EW facility. Other increases in world refined production in 2002 are expected to be mainly incremental gains from existing smelting facilities.

World copper consumption declines further

After falling by 3 per cent in 2001, world copper consumption is forecast to decline by a further 1 per cent, to 14.56 million tonnes.

	Unit	1999	2000	2001 s	2002 f	% change	
World							Copper
Production	kt	14 471	14 836	15 360	15 465	0.7	<i>After falling sharply in 2001, world copper prices are forecast to be lower on average in 2002, as a result of continued weak global demand</i>
Consumption	kt	14 090	15 163	14 696	14 555	-1.0	
Closing stocks	kt	1 472	1 061	1 600	1 600	0.0	
- weeks of consumption		6.3	4.4	7.0	7.1	1.4	
Price	US\$/t	1 573	1 814	1 580	1 525	-3.5	
	USc/lb	71.3	82.3	71.7	69.2	-3.5	
		1998	1999	2000	2001		
		-99	-2000	-01 p	-02 f		
Australia							
Mine output	kt	691	788	878	895	1.9	<i>Australian export earnings from copper are forecast to fall in 2001-02 as a result of lower world prices</i>
Refined output	kt	306	477	518	595	14.9	
Exports							
- ores and conc.	kt	1 227	936	1 152	970	-15.8	
- refined	kt	160	306	366	422	15.3	
Total value	A\$m	1 366	1 616	2 288	1 990	-13.0	
See back tables for details. p Preliminary. s ABARE estimate. f ABARE forecast.							Contact: Peter Berry + 61 2 6272 2120

Industrial production in the United States declined sharply in 2001, particularly in the manufacturing sector. For example, automobile production and energy cable output in the United States were down by 14 per cent and 11 per cent respectively in the first seven months of 2001. Demand for copper in the electronics and telecommunications industries was also particularly weak throughout the year as a result of lower world demand for high technology products and is expected to remain at similar levels in 2002.

This trend has been reflected in the US National Association of Purchasing Managers (NAPM) business activity index that fell from 47.0 in September to 39.8 in October. A reading of below 50 indicates contraction and the index has been below that level in five of the previous seven months.

Overall, consumption of copper in the United States is expected to remain weak ahead of a recovery in the major copper consuming industries in the second half of 2002, in line with assumed stronger economic and industrial production growth.

In western Europe, slower copper consumption growth is forecast, with industrial production growth declining in 2001 and expected to remain low in 2002. Lower western European demand for information technology products and lower production of euro coinage are expected to result in more moderate growth in copper consumption in 2002. In addition, German copper consumption is expected to decline sharply as a result of depressed construction activity and cuts to automobile production.

In eastern Europe, however, higher demand for copper is expected, where strong infrastructure spending (particularly on telecommunications, railways and power transmission) is expected to continue into 2002.

In much of Asia, copper consumption slowed sharply in 2001, with several key countries, particularly Japan, Korea and Chinese Taipei, experiencing lower demand for copper intensive manufactures in their major export markets, particularly the United States.

In Japan, copper consumption (especially wire, cable and brass) fell steadily throughout 2001, with Japanese automobile and

other metals intensive manufacturing industries affected by weak domestic demand and falling export orders.

Copper demand in much of Asia is expected to remain weak ahead of a recovery in major export markets in the second half of 2002.

In contrast to the rest of Asia, copper consumption in China reached record levels in 2001, and is expected to remain strong in 2002. This reflects continued spending on modernisation and infrastructure development and the continuing strong expansion of China's manufacturing base.

Chinese copper demand is expected to be further boosted by government policy to privatise China's telecommunications industry. This is likely to result in increased investment in that sector — and greater copper use — later in 2002.

With demand forecast to grow by around 8 per cent for the year, China is expected to remain a large net importer of copper and copper products in 2002.

Australian copper production to rise

Australian mine production of copper rose by 11 per cent in 2000-01 and is forecast to increase by a further 1.9 per cent in 2001-02 to 895 000 tonnes.

The combined effects of strong investment in new Australian copper mine capacity in recent years and continuing weak world copper prices since the Asian economic downturn have resulted in a sharply slower rate of new project startups in 2001 and 2002.

Newcrest's Ridgeway mine near Orange in New South Wales is the only new project expected to add to Australian mine production in 2001-02. That mine, which will have a capacity of 26 000 tonnes of copper in concentrate, is expected to commence operations early in 2002.

Refined metal production in Australia is also set to rise further in 2001-02, with the Port Kembla copper refinery expected to increase production toward its full capacity of 120 000 tonnes of cathode.

With substantial expansion in Australian metal refining capacity, production of primary refined copper in Australia has risen dramatically. In 2001-02 primary refined copper production is forecast to be

595 000 tonnes, almost double that in 1998-99.

Export earnings to fall in 2001-02

The recent large scale investment in copper refining capacity has resulted in a higher proportion of domestic mine output being processed into metal in Australia. This has left less material available for export in concentrate form and, as a consequence, the volume of copper concentrate exports is expected to fall in 2001-02.

As a result of lower average world prices, Australia's total export earnings from copper in 2001-02 are forecast to fall by 13 per cent to \$1.99 billion, despite increased export volumes of higher value refined metal.

Zinc

Zinc prices to be lower in 2002

World zinc prices are estimated to average US\$890 a tonne (US40c/lb) in 2001 — more than 21 per cent lower than the average in 2000.

Strong growth in world zinc supply and deteriorating consumption in the major economies of the United States, western Europe and Asia have resulted in lower average zinc prices in 2001, with prices falling to historic lows in real terms.

However, despite these lower prices, few producers have made production cuts,

resulting in continued strong supplies of zinc on the market. Deeper cuts to production (or substantially improved demand) will be necessary before a sustained recovery in prices occurs.

In addition to production cuts, the major influence on the global zinc market in 2002 is expected to be the timing of a recovery in the US economy and the flow-on effects to economic growth in the rest of the world. Recent interest rate cuts in the United States are expected to stimulate a recovery in that country's major zinc consuming industries in the second half of 2002.

In addition, production in and exports from China will continue to exert a strong influence on the world zinc market in 2002. With the Chinese government and industry calling for supply restraint in the face of low world prices, future growth in China's zinc exports is expected to slow from the record levels in 2000 and 2001. However, China's exports are expected to continue to have a dampening effect on the price of zinc during 2002.

With world zinc consumption significantly weaker than production in 2001, official stocks of zinc have risen. Stocks equivalent to around 7 weeks of consumption are expected by the end of the year.

With demand not expected to pick up until the second half of 2002 and announced production cuts not expected to significantly slow growth in supplies, official stocks are forecast to rise moderately in 2002, to around

	Unit	1999	2000	2001 s	2002 f	% change
World						
Production	kt	8 131	8 913	9 276	9 701	4.6
Consumption	kt	8 089	8 804	8 740	8 898	1.8
Closing stocks	kt	723	647	911	950	4.3
– weeks of consumption		5.6	4.8	7.0	7.2	0.0
Price	US\$/t	1 076	1 128	890	850	–4.5
	USc/lb	48.8	51.2	40.4	38.6	–4.5
		1998	1999	2000	2001	
		–99	–2000	–01 p	–02 f	
Australia						
Mine output	kt	1 142	1 265	1 483	1 507	1.6
Exports						
– ores and conc.	kt	1 729	1 496	1 902	1 880	–1.2
– refined	kt	274	317	391	460	17.6
Total value	A\$m	1 133	1 233	1 763	1 647	–6.6

See back tables for details. p Preliminary. s ABARE estimate. f ABARE forecast.

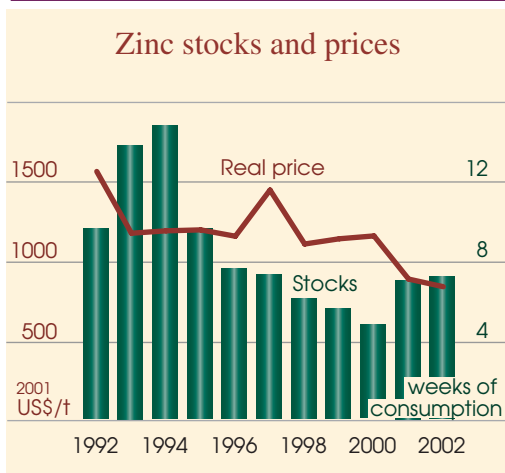
Zinc

The average world price of zinc is forecast to fall in 2002, as a result of weaker world consumption and continued strong supply



Australian export earnings from zinc are forecast to fall in 2001-02, mainly owing to lower world prices

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7.2 weeks of consumption by the end of the year.

With higher stocks and weaker consumption in the first half of the year the average price in 2002 is forecast to be 4.5 per cent lower than in 2001, at US\$850 a tonne (US\$39c/lb).

Reflecting the continued uncertainty surrounding the timing and strength of the expected turnaround in world demand, the depth of cuts made to world production and the level of Chinese exports, the 2002 average price of zinc is forecast to have a 75 per cent probability of being in the range US\$760–920 a tonne (US\$34–42 c/lb).

World zinc production to grow despite significant cuts ...

World zinc mine production is estimated to have grown by 4.7 per cent in 2001, to 9.1

million tonnes, despite cuts from some high cost producers. In 2002, mine production is forecast to grow by a further 2.5 per cent to 9.33 million tonnes.

The most significant increases expected in 2002 are from two new mines in the Americas. The Antamina copper/zinc mine in Peru has a design capacity of 275 000 tonnes of contained zinc a year, and is expected to become the world's third largest zinc mine. Penoles' Francisco I Madero mine in Mexico is expected to produce 127 000 tonnes of zinc in concentrate a year. Both mines commenced production in the second half of 2001.

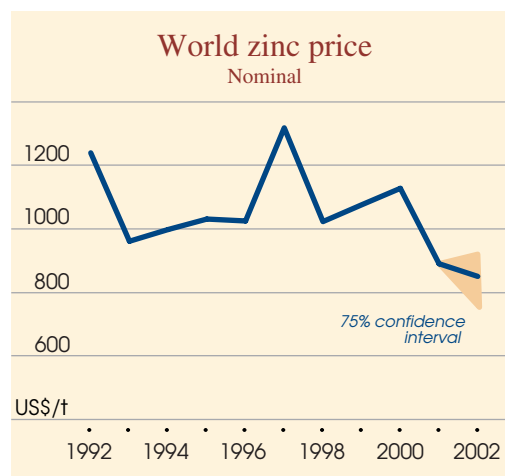
A significant contribution to world mine supply in 2002 is also expected from increased output at the Lisheen mine in Ireland, which is building toward full capacity output. Lisheen has a nameplate capacity of 175 000 tonnes of zinc in concentrate a year.

In China, zinc mine production growth is expected to slow significantly in 2002, in response to official attempts to limit capacity growth in the face of low world zinc prices. However, China will still make a net addition to world supply in 2002.

Also adding to world production is the restart of Teck Cominco's Trail operation in Canada, which was closed earlier in 2001 in order to sell electricity into the US grid — a more profitable strategy than producing zinc using high cost energy. With electricity prices in the Pacific Northwest now having fallen, Teck Cominco resumed full production (of 100 000 tonnes a year) at Trail in October 2001.

Only partially offsetting world production increases are some significant capacity closures announced in 2001. Among these was the closure in November of the Tara zinc mine in Ireland with a loss of 200 000 tonnes of contained zinc a year. Also in November, Asarco closed its Tennessee operations, with a loss of 57 000 tonnes of zinc in concentrate.

In addition, AngloAmerican has announced the closure of its Ruttan zinc/copper mine in Canada (30 000 tonnes) to take effect from May 2002. Teck Cominco's Sullivan and Polaris mines in Canada (production of 100 000 tonnes and 130 000 tonnes a year respectively) are expected to



close at the end of 2001 because of exhaustion of ores.

World refined zinc production in 2001 is estimated to have grown by 4.1 per cent to 9.28 million tonnes. In 2002, production is forecast to grow by a further 4.6 per cent to 9.7 million tonnes.

In Spain, new production from Asturiana de Zinc's recent expansion at its San Juan de Nieva smelter came on stream in the second half of 2001. At full production, the smelter will have a capacity of 460 000 tonnes a year, up from 340 000 tonnes previously.

In 2002, significant increases in world refined zinc capacity are also expected at the Tres Marias smelter in Brazil (an extra 50 000 tonnes) and at the Chelyabinsk smelter in the Russian Federation (50 000 tonnes).

In China, zinc metal production growth is estimated to have slowed in 2001, in response to government and industry attempts to rationalise and limit production in response to poor market conditions.

Major cutbacks in world zinc capacity remain likely in 2002 as a result of rising stocks and poor zinc prices. Particularly vulnerable are facilities in the Pacific Northwest of the United States where relatively high cost producers and a high US dollar have been hurting company profitability.

Further cuts to world metal supply are expected after the US Defense Logistics Agency decided in late August 2001 to suspend zinc sales from its stockpile. The agency, which typically sells 25 000–40 000 tonnes of zinc a year, may extend the suspension beyond the first quarter of 2002 as a result of low zinc prices.

World consumption weak ahead of recovery in 2002

World consumption of zinc in 2001 is estimated to have fallen by 0.7 per cent to 8.74 million tonnes but is forecast to rise by 1.8 per cent in 2002, to 8.9 million tonnes.

With galvanising accounting for almost half of world zinc consumption, expected growth rates in the construction and automotive sectors are key indicators of zinc consumption.

Motor vehicle production in the United States slowed significantly in 2001 in response to slower consumer demand (sales

down 13 per cent in the year to September) and large vehicle inventories.

Weaker US consumption of zinc has also been evident in the construction industry and in the manufacture of consumer durables, with galvanised steel shipments falling by 12 per cent in the year to July. The US National Association of Purchasing Managers survey for October indicates that this weakness continued in the second half of 2001.

Zinc consumption in the United States is expected to remain weak ahead of an expected recovery in the major zinc consuming industries in the second half of 2002, in line with assumed stronger economic and industrial production growth.

In western Europe, slower zinc consumption growth is forecast, with industrial production growth declining in 2001 and expected to remain low in 2002. Worst affected is Germany where zinc consumption is expected to decline sharply as a result of very weak construction activity and cuts to automobile production.

Zinc consumption in some Asian countries was down in 2001 and is expected to remain low in 2002. Slow growth in zinc consumption is expected in the Republic of Korea and Chinese Taipei in 2002 as a result of weak industrial production growth and slower exports of manufactured goods, particularly to the United States.

Japanese demand for zinc has declined in 2001. Data from the Ministry of Economy, Trade and Industry show that Japanese consumption of zinc fell by 8.6 per cent in the first half of the year and that demand continues to be weak in the second half. Declining economic and industrial production growth, depressed consumer demand and weak prospects for export growth are expected to persist in 2002.

In China, however, strong growth in zinc consumption is expected in 2002, in line with an assumed continuation of robust economic growth and ongoing infrastructure development.

Australian zinc production to rise ...

Australian mine production of zinc rose by 17 per cent in 2000-01, to 1.48 million tonnes, and in 2001-02 is forecast to increase by 1.6 per cent to 1.51 million tonnes.

Pasminco's Century mine in Queensland is expected to account for most of the modest increase in mine production in 2001-02. Century is expected to have reached full production capacity of 500 000 tonnes of zinc in concentrate at the end of 2001.

After strong rises over the past three years as a result of investment in smelting capacity, Australian output of primary refined zinc is expected to rise by 3 per cent to 550 000 tonnes in 2001-02, mainly through efficiencies at existing smelters.

... export earnings to fall

After growing by 43 per cent in 2000-01, Australian export earnings from mine and refined zinc are forecast to fall by 7 per cent in 2001-02, to \$1.65 billion.

The forecast fall in earnings is a result of lower world zinc prices more than offsetting the expected significant increase in (higher value) refined zinc exports.

commodities

australian



ARTICLES

Delivery charges for water

Their impact on interregional trade in water rights

Tim Goesch



The low levels of interregional trade in water entitlements in the Murray Darling Basin suggest that some irrigation authorities may restrict out of scheme trade.



One reason an authority may want to retain water within an irrigation system is to protect itself against the prospect of stranded assets. The risk of stranded assets could be minimised by using a multipart tariff that directly contracted the capital costs of water delivery to irrigators. If trade barriers designed to avoid stranded assets were then removed, the transfer of water to higher value uses would be facilitated.

Introduction

In 1994 the Council of Australian Governments (COAG) endorsed a set of guidelines for reforming the management of Australia's water resources. Within this forum, trade in water entitlements was identified as the key mechanism for maximising the contribution of water to national income. A well designed water market can be a mechanism for facilitating the transfer of water to higher value uses, thereby increasing the allocative efficiency of water use.

Since 1994 there has been a dramatic increase in trade in water entitlements. In 1995 the Murray Darling Basin Ministerial Council decided to introduce a cap on diversions from the basin. The aim was to achieve a balance between environmental and consumptive uses. Prior to the cap there was little incentive to trade since increased demands for water were largely met administratively through increased allocations to irrigators. The cap effectively limited entitlement holders' access to water, forcing them to meet any increases in demand through trade.

Despite the recent increase in water trade, most of this trade has been in temporary entitlements and within local valleys. The low levels of intervalley and interstate trade suggest that there may be some impediments to trading water outside of local valleys. Constraints on trade have the potential to significantly reduce the economic benefits from water use.

Outline

Following a brief review of the extent of trade in water entitlements, and some of the

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constraints placed on trade, is an analysis of a water delivery pricing option that has the potential to significantly free up the trading environment.

Multipart tariff and contracts

A multipart tariff with the capital costs of delivery directly contracted to irrigators is assessed. Such a scheme would significantly reduce the financial risk of irrigation authorities being left with stranded assets. This reduced risk should in turn minimise opposition to the removal of trade barriers that are designed to protect authorities against stranded assets, thereby facilitating the transfer of water to higher value uses.

In addition, contracts can act as a guide for investment, with investments proceeding only when irrigators believe that the higher net irrigation benefits flowing from the investment will cover the cost of the investment.

The importance of using contracts to guide future investments should not be underestimated given that several billion dollars worth of irrigation infrastructure is nearing the end of its effective life, and will need to be considered for refurbishment in the near future.

Trade in water entitlements

While markets for temporary and permanent water entitlements have existed in parts of the Murray Darling Basin since the early 1980s, these markets were fairly inactive until recently. In 1994 the states committed to instituting trading arrangements by 1998 in regions where they did not already exist. This commitment formed part of the COAG agreement on water reform, and was in recognition of the role that trade can play in generating greater economic benefits from water use. The states also relaxed the rules governing trade (trade was initially confined within irrigation systems) to allow intervalley and interstate trade in entitlements.

In 1998-99 almost 11 000 gigalitres of water were diverted for irrigation within the Murray Darling Basin (MDB 2000). Of the volume diverted for irrigation, around 855 gigalitres, or 8 per cent, was traded. Of the volume traded, almost 90 per cent comprised trade in temporary entitlements, with

trade in permanent entitlements accounting for the remainder.

Perhaps more illustrative for the purpose of this article, of the 855 gigalitres traded, more than 90 per cent was traded *within* valleys. Intervalley trade within states comprised a mere 6 per cent of trade, with interstate trade accounting for less than 3 per cent.

Of total diversions for irrigation, intervalley and interstate trade (from here on referred to as interregional trade) accounted for less than 1 per cent.

The low level of interregional trade may have been caused by a number of factors.

First, the difference in the net marginal benefits earned by irrigators in different valleys may be insufficient to encourage trade, or the transaction costs associated with interregional trade may be excessive. ('Net marginal benefit' refers to the benefit earned by an irrigator from the use of an extra megalitre of water *less* all costs associated with using that megalitre of water, including the cost of delivery.)

Moreover, in regions where trade has only recently been introduced, irrigation authorities may be grappling with the implementation of the new operational rules, and therefore concentrating initially on the development of an effective local market.

Some irrigators may also be reticent to purchase permanent water because they are uncertain about the size of future entitlements. This may be the case where environmental flows are yet to be determined, and there is a risk that governments will reduce future irrigation entitlements without compensation in order to source these flows.

Interregional trade may also not occur owing to physical constraints or constraints imposed by irrigation authorities for the reasons explained below. For example, in some years it may not be physically possible to trade water from the upper Goulburn Broken to the upper Namoi.

While it is difficult to comment on the degree to which these factors constrain trade, it is clear that physical constraints preclude trade between some regions, while in other regions where interregional trade is physically possible, irrigation authorities may actively constrain trade outside the scheme.

Trade restrictions

Currently, irrigation authorities impose a raft of restrictions on interregional trade in water entitlements. For example, the Murrumbidgee, Jemalong and Trangie Nevertire irrigation schemes prohibit permanent out of scheme trade, whereas Murray Irrigation prohibits permanent out of scheme trade once the bulk entitlement (that provides irrigation authorities with specified rights and entitlements to water) falls below a certain level (Marsden Jacob Associates 1999). In Victoria, water authorities can refuse permanent out of area transfers if annual net transfers out of an area exceed 2 per cent of the water rights in that area (Brinsley et al. 2000).

These blanket restrictions on trade suggest that constraints have not been imposed to improve the efficiency of resource use, as may be the case, for example, if out of scheme trade exacerbated environmental problems such as salinity in recipient regions or led to higher conveyance losses. Rather, it appears that many of these restrictions have been imposed to retain water within an irrigation system.

Two major reasons why an irrigation authority may want to retain water within a system include the need to protect itself against the prospect of stranded assets, or to maintain the economic viability of the region in which it operates.

The use of a water delivery pricing policy that minimises the potential for stranded assets is the focus in this article, while the reduced economic viability of regions that lose irrigation water is better dealt with directly through structural adjustment packages.

Stranded assets

The term 'stranded assets' refers to a situation where an irrigation authority is stuck with large fixed infrastructure costs and no customers (see box 1 for examples of some of the infrastructure required for irrigation). Such a situation may arise when economic circumstances change or where an inappropriate charging regime is used to collect the costs of delivering water.

Where economic circumstances change and cause the net benefits (both private and social) from irrigation to fall in a particular region — say because of worsening environmental problems associated with water use or a decline in demand for the irrigated produce of the region relative to that from other regions — the closing down of an irrigation system may be the socially optimal response.

As an example, consider two regions connected by a common river. Both regions initially irrigate pasture. However, it is discovered that with recent genetic improvements in viticulture, region A is ideally suited to growing grapes (this is not a viable option for region B because of inappropriate soil type). If the difference in the net marginal benefits from viticulture and pasture are such that all water is traded out of region B, then closing down the region B system (and expanding region A) may be the socially optimal response in that it maximises the benefits from the limited water resource.

The use of infrastructure is inefficient where stranded assets result from a pricing policy that causes irrigators to cease using infrastructure earlier than would otherwise have occurred. Such a pricing regime would be one that allowed irrigators leaving an irrigation system to impose higher delivery charges on irrigators remaining in a system. As irrigation delivery is dominated by fixed costs, these higher charges may result from the fixed costs of delivery being spread over fewer irrigators (for more detail see Goesch 2001). These higher charges may in turn lead

1 Investing in irrigation delivery services

The irrigation delivery service industry requires large fixed investments. Supplying water to irrigators involves the construction of dams and weirs to store and control the flow of water, and channels to divert water from rivers to individual irrigators. Where there is excessive seepage, authorities may also need to line channels with concrete or plastic, or construct pipelines. Other infrastructure, such as pumping equipment, is also required.

to other irrigators trading their water out of the system.

If the cycle continues, it could lead to a situation where delivery charges were so high that they were beyond the financial capacity of those remaining in the system, leaving the irrigation authority with large fixed costs and no customers.

Cost of delivering irrigation water

The cost of delivering water to irrigators comprises both fixed and variable costs. The fixed costs of delivery include capital and other overhead costs that do not vary with the volume of water delivered. Variable costs, on the other hand, do vary with the volume of water delivered. The irrigation industry tends to be dominated by fixed costs, with variable costs comprising a relatively small component of total delivery costs.

Natural monopoly

The provision of distribution services for irrigation water is often a natural monopoly. A key feature of a natural monopoly is that the average cost of supplying a good or service increases with the number of providers. This can occur because large fixed investments in infrastructure are required by each provider in a region (box 1).

That is, the cost of delivery of irrigation water by a single provider will be lower than the combined costs of multiple providers, each with its own delivery infrastructure. It is therefore more efficient to have only one water distribution system in a geographic area (Watson 1995).

Efficient pricing of irrigation delivery services

In an irrigation system where trade can occur between regions and in the absence of transaction costs and externalities, the net benefits of water use will be maximised where the marginal benefits from irrigation are equal to the marginal cost of delivering water *plus* the traded price of water at the source (otherwise known as the opportunity cost of water use). In this instance, 'marginal

benefit' refers to the benefit earned from the last megalitre of water delivered less all costs directly associated with the use of that water (for example, the cost of extra seed and fertiliser associated with the use of that extra megalitre of water), excluding the cost of delivery (marginal delivery cost) and the traded price of water.

Under these circumstances there will be no further opportunities to increase the net benefits from water use through trade. Hence, the use of marginal cost pricing for irrigation delivery services is critical to maximising the benefits from water use and the use of delivery services.

For an existing water delivery system, however, the marginal cost of water delivery does not include the capital and overhead costs of delivery. For a natural monopoly, such as a single provider of irrigation delivery services, the setting of charges equal to marginal cost would result in a revenue deficiency as variable costs form a small component of total costs.

Recouping the deficit

There are several options available to irrigation authorities to recover the full cost of delivering water. These include using either variable or fixed fees, or a combination of the two (box 2). The ideal fee would be one that allowed irrigation authorities to recover the full cost of delivering water while facilitating the transfer of water to higher value uses.

Average cost pricing

It is possible for a delivery utility to recover the full costs of delivery by combining its fixed and variable costs into a single charge. This pricing strategy is known as average cost pricing. The problem with average cost pricing is that it can lead to the underuse or inefficient use of irrigation infrastructure, while exposing an irrigation authority to the possibility of stranded assets.

Delivery charges set higher than marginal cost (as is the case with average cost pricing for a natural monopoly) will result in too little irrigation as farmers who cannot meet average costs but can meet marginal costs will choose not to irrigate (Freebairn 1998).

2

Irrigation delivery charge reforms

In 1994 COAG endorsed the full cost recovery of irrigation delivery services by 2001. The state governments and regional water authorities responded by altering both the structure and level of water delivery charges. The table below contains a breakdown of the structure and level of water delivery charges for some irrigation districts within the Murray Darling Basin.

The typical fee structure for delivery services tends to be a small fixed fee to cover office

administration, an allocation fee based on 100 per cent of an irrigator's allocation and a volumetric fee based on consumption. Given that irrigation delivery services are highly capital intensive, it is likely that the volumetric fees charged by many irrigation authorities include not only costs directly associated with the volume of water delivered in a season, but also a significant share of the capital and overhead costs of delivery.

Examples of the structure and levels of water delivery charges in the Murray Darling Basin, 2000-01 irrigation season

St George Irrigation Area, Queensland

	Water from a channel	Water from Beardmore Dam or regulated section of the Balonne River
<i>Fixed charges</i>		
Annual account fee	\$366	\$183
Allocation charge	\$15/ML ^a	\$7.28/ML ^a
<i>Volumetric charges</i>		
Use up to announced allocation	\$9.50/ML	\$6.20/ML

Murrumbidgee Region, New South Wales

	Yanco and Mirrool Irrigation Areas	Benerembah, Tabbita and Wah Wah Irrigation District
<i>Fixed charges</i>		
Administration/service fee	\$285	\$285
Asset replacement fee on outlets	\$10 per pipe or door \$50 per small wheel \$65 per large wheel	\$10 per pipe or door \$65 per large wheel \$65 per large wheel
Allocation fee	\$3.47/ML ^b	\$3.47/ML ^b
Asset replacement levy	\$1.78/ML ^b	\$1.78/ML ^b
<i>Volumetric charges</i>		
Use charge based on total large area water sales — for example:		
Sales		
650 000 ML	\$13.02/ML	\$8.72/ML
750 000 ML	\$11.43/ML	\$7.62/ML
820 000 ML	\$10.05/ML	\$7.03/ML

Shepparton Irrigation Area, Victoria

<i>Fixed charges</i>	
Water right (charged on size of water right held regardless of use)	\$24.02/ML
<i>Volumetric charges</i>	
Use in excess of water right (sales water)	\$24.02/ML

Central Irrigation Trust Districts, South Australia

<i>Fixed charges</i>	Berri, Chaffey (Ral Ral), Cobdoglah, Kingston, Moorook, Waikerie Irrigation Trusts (low pressure systems)
Irrigation access charge	\$5.12/ML \$308 minimum charge ^c
Catchment environment levy	\$3.50/ML ^c
Rehabilitation contribution	\$9.20/ML ^c
<i>Volumetric charges</i>	
Use up to allocation	\$34.00/ML
Use between 100 and 120 per cent of allocation	\$68.00/ML
Use above 120 per cent of allocation	\$136.00/ML

^a Based on 100 per cent of allocation. ^b Allocation fee and asset replacement levy based on the greater of 100 per cent volumetric allocation and actual usage. ^c Based on 100 per cent of allocation.

Moreover, if irrigation authorities seek to recoup delivery costs through average cost pricing, and there are regional differences in the mix of fixed and variable costs of delivery, then the regional pattern of water use may be inefficient. For example, if the marginal cost of delivering water and irrigators' willingness to pay for water are identical in two regions, but there are significantly higher fixed costs in one region, then average cost pricing will result in less water being used in that region than in the region with lower fixed costs. If marginal cost pricing had been used, the level of water use in each region would have been the same.

Average cost pricing can also leave an irrigation authority exposed to the financial risk associated with stranded assets. This can occur when all costs are recouped using a fee based on the actual quantity of water delivered. Under this arrangement, if irrigators trade their water out of a region they are no longer liable to pay the fee. As a result, the fixed costs of delivery will have to be spread over fewer irrigators, with the authority having to raise the volumetric fee for those remaining in the system.

Multipart tariffs

One option for meeting the revenue deficiency generated by pricing at marginal cost is to adopt a multipart tariff. Multipart pricing involves the use of a fixed charge, together with a variable charge based on consumption. The variable charge is set equal to the marginal cost of delivery while each irrigator is charged a separate fee, not related to water use, to cover the fixed costs of delivery.

By maintaining the features of marginal cost pricing, a multipart tariff provides the opportunity to maximise the economic benefits from using irrigation delivery services while maintaining the viability of the service provider by allowing the provider to recoup any fixed costs through a fixed fee.

The method of collecting the capital component of the fixed costs of delivery, however, has the potential to affect the use of the infrastructure. Under a multipart tariff, capital costs can be collected either as part of an annual access fee (which includes overhead

costs) or separately through a system of long term contracts.

Annual access fee

Irrigation authorities that collect the capital costs of delivery using annual access fees can still expose themselves to the financial risk of stranded assets (Gordon, Kemp and Mues 2000).

Consider, for example, an irrigation authority that has just invested in new delivery infrastructure. If, following the investment, there is a decline in the benefits from irrigated activities in the region, there may be net trade in water out of the region. When these irrigators trade water out of the district, they will no longer be liable to pay the annual access fee. This loss of revenue means that access fees to irrigators remaining in the system will have to increase if the viability of the irrigation supplier is to be maintained. These higher access fees could compromise the economic viability of other irrigators within the district, causing them to sell their entitlement out of the district, and so the cycle continues.

A closer look at the fixed costs of delivering irrigation water reveals that some costs are more fixed than others. Whereas capital costs are ongoing regardless of whether the delivery system is operated, the annual overhead costs of operating and maintaining the system can be avoided if the system is not operated. In the more realistic case where only some irrigators leave the system, the consequent decline in the intensity with which the delivery system is operated may lead to a decline in the overhead costs of delivery.

Long term contracts

The potential for stranded assets could be minimised if the capital costs of delivering irrigation water were separated from the annual overhead costs of operating the system.

A system of long term contracts could be introduced to pay for new or refurbished infrastructure, with the contract stating the obligations of the service provider and the irrigation licence holder. In return for agreed rights of access to the delivery system the irrigator would agree to repay (either over time or as a lump sum) the capital costs

associated with the new infrastructure (box 3). The contract would remain binding even if irrigators sold their entitlement. Alternatively, at any time, the remaining debt could be included as a condition of sale of the licence, with the purchaser being responsible for the debt.

A system of contracts effectively internalises the costs imposed on other users within a system when irrigators choose to trade water out of the system.

Such a system of contracts would therefore provide long term revenue security to the service provider, reducing its risk in undertaking new investments. Instead of the service provider assuming the investment risk — as is the case where capital costs are covered by an annual access fee that can be avoided when irrigators opt out of the system — under a system of contracts the risk is effectively spread among the irrigators.

By removing the possibility for irrigation authorities that capital costs will not be met when irrigators choose to trade their water out of the system, long term contracts will reduce the perceived need by some authorities to restrict trade in water entitlements.

While a system of long term capital contracts does not avoid the potential for stranded assets, as irrigators can still impose higher overhead costs on other users if they trade their entitlement out of the system, it does minimise the possibility.

In reality, the emergence of a stranded assets problem is more likely to occur in regions where there are few irrigators than where there are many, and where these irrigators earn small profits.

The impact of the loss of an irrigator in a small system in terms of the higher fixed costs imposed on those remaining in the system is likely to be much greater than in a system with many irrigators. The risk of stranded assets increases where a large proportion of water is used by irrigators who earn small profits. In the southern regions of the Murray Darling Basin, for example, a significant proportion of water is used for lower value broadacre production.

Exit fees

Exit fees have been proposed as a means of reducing opposition to permanent out of scheme trade in water rights (Marsden

3

Contract design and implementation

A system of long term contracts for new and refurbished infrastructure would legally bind both irrigators and irrigation authorities. Irrigators would be liable to pay for the capital costs of infrastructure, and would remain so even if they chose to permanently trade their water right. It would be expected that the capital costs would not include maintenance costs as these costs can be avoided if the system is not operated. Moreover, the terms of payment under the contract could be flexible (that is, allow payment in instalments or as a lump sum) to avoid undue cash flow problems for irrigators.

Irrigation authorities would be required to provide long term access to infrastructure under prespecified terms and conditions. These terms and conditions could, for example, spell out how access to infrastructure is determined when capacity is constrained. Hence, under a system of long term contracts, irrigators would

have more secure access to infrastructure than they currently have.

While the transfer to a system of long term contracts for new and refurbished infrastructure is expected to lead to significant economic benefits (largely associated with the freeing up of trade in water rights), there are also potential costs associated with its introduction. For example, implementing the new system will involve negotiations between irrigation authorities and irrigators. Irrigation authorities will need to convince irrigators that it is in their interest to sign the contract, while irrigators may be reticent because of the increased financial risk they face by signing the contract compared with the status quo.

In addition to negotiation costs, there will be administration and enforcement costs. As with any contract, in the event that either party should choose not to abide by its terms and conditions, there will be costs associated with pursuing a legal and financial solution.

Jacobs Associates 1999; Brinsley et al. 2000). The aim of these fees is similar to that of long term contracts — that is, to prevent the imposition of higher costs on irrigators remaining in a scheme when other irrigators choose to leave it. Western Murray Irrigation currently imposes exit fees.

Brinsley et al. (2000) propose that exit fees 'be based on sound and consistent principles which reflect the true cost of water leaving the system', and suggest that the fee be calculated as the net present value of the outstanding future annual charges that the individual would have faced had they remained in the system.

As long as volumetric delivery fees are set at marginal cost, the question whether capital costs are recouped through a system of long term contracts or exit fees is likely to have little impact on efficiency. So long as irrigators are aware that they are liable for any outstanding costs in the form of an exit fee, they will consider their capital costs to be sunk, and base their decision on whether to irrigate or trade water on the opportunity cost of water, which includes the marginal cost of delivery. Moreover, these irrigators will be unable to impose higher capital costs on other users if they leave the system.

The inclusion of annual noncapital overhead costs in an exit fee (as suggested by Brinsley et al.) is likely to be less warranted, however, as some of these costs may be avoided if the irrigation system is operated less intensively when water is traded out of the system.

Irrigators should also be given the choice to repay outstanding capital costs annually or as a lump sum. Any requirement that these debts be repaid as a lump sum could cause cash flow problems for some irrigators, and act as a deterrent to trade.

Whether there is any economic justification for recovering the outstanding capital costs of existing (as opposed to new or refurbished) infrastructure will depend on whether the infrastructure has an alternative use (opportunity cost). If not, as is likely to be the case with much irrigation infrastructure, the capital costs should be considered sunk since the infrastructure has no resale value. Seeking to recover capital costs under these circumstances will not increase the efficiency with which irrigation infra-

structure is used and, in fact, may reduce it. This is because irrigators who cannot afford to pay these capital costs, but can afford to pay the remaining costs, will choose not to irrigate.

Given that exit fees and long term contracts have similar beneficial impacts if appropriately designed, a practical option for irrigation authorities may be to use long term contracts for new investments in infrastructure (both new and refurbished) and to recover any outstanding debts for existing infrastructure (where appropriate) from those leaving the system via exit fees.

The advantage of contracts is transparency

The advantage of using long term contracts over exit fees for new investments is that irrigators will know their capital liability in advance of the investment taking place. The irrigators' willingness to pay will then determine whether the investment takes place. That is, irrigators will be prepared to pay for the investment only if they believe that they will receive an acceptable return on funds invested. Hence, the use of long term contracts effectively imposes a market test on new investments and, in doing so, increases the likelihood that these investments are only undertaken where they are economically viable. This is consistent with COAG guidelines.

The argument in favor of introducing a system of contracts to guide future investments is strengthened by the fact that several billion dollars worth of irrigation infrastructure in Australia is nearing the end of its effective life, and will need to be considered for refurbishment in the near future.

Conclusion

The low levels of intervalley and interstate trade in water rights could, in part, be the result of some irrigation authorities imposing restrictions on out of scheme trade. One reason why authorities may want to restrict out of scheme trade is to protect themselves against stranded assets. The type of pricing policy used to collect the costs of delivering water to irrigators can influence the level of risk posed to irrigation authorities by stranded assets.

Currently, many irrigation authorities impose delivery charges that more closely resemble average cost pricing than marginal cost pricing. Apart from risking the under-use or distorted use of infrastructure, the use of average cost pricing (or a volumetric tariff to collect some of the fixed costs of delivery) also leaves an irrigation authority exposed to the possibility of stranded assets.

While the benefits from the use of irrigation water and infrastructure will be enhanced by the use of a multipart tariff with the volumetric fee set at the marginal cost of delivery, it may be possible to increase these benefits further if the capital costs of delivery are funded separately through a system of contracts rather than through annual access fees.

Long term contracts allow irrigation authorities to protect themselves against stranded assets. Hence, this option is likely to minimise opposition by irrigation authorities to the removal of barriers to trade in water, thereby facilitating the transfer of water to higher value uses. The use of long term contracts also ensures that the decision to invest in infrastructure is transparent, increasing the likelihood that these investments are economically viable.

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Australian coal supply

Investing in additional capacity

Robert Curtotti and Andrew Maurer



Future investment in Australian coal supply will be determined by growth in international coal demand and the success of the domestic industry in attracting investment capital based on expectations of future competitiveness of supply.



Recent decreases in the costs of coal mining, internal haulage and ship loading costs provide the domestic industry with the opportunity to benefit significantly from projected increases in global coal demand. Reflecting this, Australian coal producers are progressing investment schedules that will potentially add substantial new export capacity.

Snapshot of Australian coal exports

The Australian coal export industry has grown rapidly over the past four decades, with exports rising from 1.2 million tonnes in 1960 to an estimated 195 million tonnes in 2001 (equivalent to around 32 per cent of world coal trade). This level of exports places Australia as the world's largest exporter of hard coal (table 1), a position it has held since 1986 when its exports surpassed those of the United States. The second largest exporter in the world in 2001 is China, with estimated coal exports of 87 million tonnes.

Although the largest exporter, Australia is currently only the fifth largest world producer of hard coal, as domestic consumption is not significant by world standards.

The early period of expansion of Australia's coal export industry was based on high growth in demand for metallurgical coal from Japan. The rapid industrialisation of the Japanese economy led to substantial growth in blast furnace steel output. As Japan has few indigenous coal reserves, growth in domestic blast furnace output was fed by imports of metallurgical coal.

Growth in Australian coal exports was further boosted by the oil price shocks of the 1970s that led to a rapid substitution in demand away from oil to thermal coal in the power generation sector.

Supporting Australia's coal export industry is an abundance of high rank reserves (approximately 68.3 billion tonnes of measured and indicated reserves in New South

The projections in this article draw on research undertaken for an ABARE research report, *Global Coal Markets – Prospects to 2010*, to be released in January 2002.

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Wales and Queensland in 2000) (Barlow Jonker 2001). Most of these reserves are located within 300 kilometres of Australia's east coast and are predominantly in the New South Wales Hunter Valley and the Bowen Basin in Queensland (map 1).

In New South Wales, reserves are suited most to thermal applications but there are also significant quantities of lower rank (semisoft) metallurgical coal. In Queensland, reserves are suited to both thermal and metallurgical applications; however, exports are mainly hard coking coals.

Of all hard coal exported from Australia in 2001, about 88 million tonnes were thermal coal and 108 million tonnes were metallurgical coal. Current hard coal reserves are sufficient to maintain Australia's 2001 level of black coal production and exports for about 200 years.

Most of Australia's coal exports (approximately 70 per cent) go to customers in the Asian region. Japan is Australia's largest customer of coal, taking an estimated 39 per cent of Australia's metallurgical coal exports

and 60 per cent of thermal coal exports in 2001 (table 2).

The second largest market for Australian coal is western Europe, which took an estimated 14 per cent of all hard coal and 21 per cent of all metallurgical coal exported from Australia in 2001.

Future investment in Australian coal export capacity will be dependent on growth in demand for coal in these markets.

Trends in world coal consumption to 2010

ABARE's GTEM-Coal model was used in a recent study (Mélanie et al. 2002) to project coal consumption, production and trade in the period from 1999 to 2010 (see box 1 for a description of the features of GTEM-Coal).

GTEM-Coal projects that global hard coal consumption will grow by 1.9 per cent a year between 1999 and 2010 to reach 4.2 billion tonnes, up from 3.6 billion tonnes in 2000. Much of this demand growth will be for thermal coal, underpinned by ongoing investment in new coal fired electricity generation capacity around the world. This investment will be made in an environment of competing sources of energy, including gas, hydro and nuclear power and oil. Coal is widely recognised as being a cheaper source of energy for baseload power generation than either oil or gas, despite the relatively higher capital costs required to construct new plants.

Most growth in world thermal coal consumption is projected to be in the fast growing Asian region. As in the past decade, growth in electricity demand in Asia is expected to be significantly higher than in more mature developed economies. Despite the recent downturn in growth of the world economy, the Asian region is expected to continue growing at levels substantially higher than other regions.

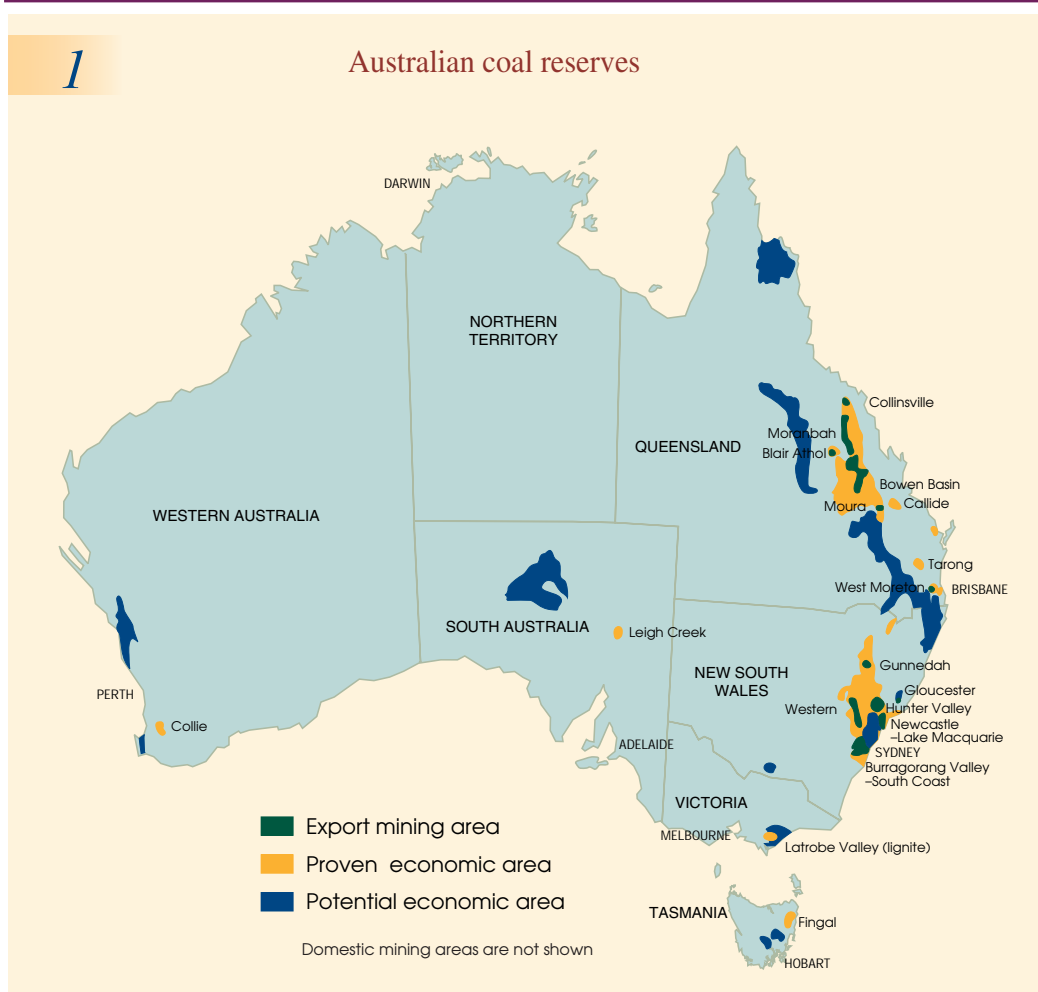
An estimated 34.6 gigawatts of additional coal fired electricity generation capacity is expected to be commissioned in this region in the period 2000–03. At least 6.6 gigawatts, representing 20 per cent of the new Asian capacity over this period, will be built in Japan (IEA 2001).

In Japan, thermal coal consumption is expected to grow faster than electricity

1 World hard coal production and exports, 2000

	Production	World share	Exports	World share
	Mt	%	Mt	%
China	1171.1	32	55.0	9
United States	899.1	25	53.0	9
Russian Federation	321.6	9	60.1	10
India	309.9	9	0.9	0
Australia	238.1	7	177.2	30
South Africa	225.3	6	69.9	12
Poland	102.2	3	23.7	4
Other eastern Europe	17.1	0	5.9	1
European Union	88.3	2	12.3	2
Indonesia	78.6	2	56.8	10
Korea, Dem. Rep. of	67.2	2	0.4	0
Colombia	37.1	1	34.5	6
Other Asia	34.2	1	5.3	1
Canada	33.8	1	31.7	5
Other Latin America	15.4	0	8.2	1
World	3 638.7	100	594.9	100

Source: IEA (2001).



2 Estimated Australian coal exports, by destination, 2001

	Hard coal		Metallurgical coal		Thermal coal	
	Exports	Share	Exports	Share	Exports	Share
	Mt	%	Mt	%	Mt	%
Japan	94.1	48	41.9	39	52.2	60
Europe	27.5	14	22.5	21	5.0	6
Korea, Rep. of	19.7	10	6.9	6	12.8	15
Chinese Taipei	13.0	7	4.4	4	8.6	10
India	9.5	5	9.5	9	0.0	0
Brazil	4.4	2	4.4	4	0.0	0
Turkey	1.1	1	1.1	1	0.0	0
Other	26.1	13	17.1	16	9.0	10
Total	195.4	100	107.8	100	87.6	100

Sources: Australian Bureau of Statistics, Canberra and ABARE estimates.

consumption, reflecting the increasing share of coal in the fuel mix for electricity generation, which is projected to rise to 22 per cent by 2010 from 19 per cent in 1998. Japan's consumption of thermal coal is projected to increase by about 13 million tonnes to 93 million tonnes in 2010, all of which is expected to be imported. This does not include additional demand expected to occur if planned liberalisation of Japan's electricity sector proceeds. This could add an additional 10 million tonnes to imports in 2010.

1 GTEM-Coal

ABARE's global trade and environment model (GTEM) is a multiregion, multisector, dynamic general equilibrium model of the world economy. These features make GTEM particularly effective for analysing energy markets where interaction between sectors and economies is significant.

GTEM-Coal — a specific module of GTEM — builds on this capacity and incorporates additional features designed to enhance ABARE's capacity to analyse international coal markets. These include:

- a comprehensive treatment of different types of coal — brown thermal coal, black thermal coal and coking coal;
- identification of the world's key coal supply and demand regions; and
- a detailed representation of technological change and interfuel substitution possibilities in the industries that are the primary users of those coals, namely electricity generation and iron and steel.
- the capacity to analyse the most important policy issues that are likely to determine the future direction of the coal industry, including energy market liberalisation and international climate change responses

GTEM-Coal is used to develop reference case projections for coal consumption, production and trade to 2010 and to analyse the impacts of policy changes on these key variables.

The reference case in GTEM-Coal represents the likely outlook for international coal markets in the absence of major policy changes. The reference case also provides a benchmark against which potential or likely policy initiatives can be compared.

Demand for thermal coal is also projected to rise in other Asian economies. The most rapid growth in coal consumption in Asia is projected to take place in the ASEAN economies of Malaysia, Thailand and the Philippines. Thermal coal imports to the ASEAN region as a whole are projected to reach 30 million tonnes in 2010, an increase of 14 per cent a year from the 1999 level.

Similarly, thermal coal consumption is projected to increase rapidly in the large coal importing economies of the region — the Republic of Korea and Chinese Taipei — reflecting rising demand for electricity and increased reliance on coal in the power generation fuel mix.

Relative to thermal coal, global demand for coking coal is projected to grow less strongly over the period to 2010, at around 1 per cent a year. Growth in coking coal consumption is projected to be slowed by the increasing adoption of steel making technologies that do not rely on coking coal as a feed product. Further, less coking coal per unit of steel output is expected to be required in blast furnace steel mills as a result of increasing rates of pulverised coal injection and improved operational efficiency.

Emerging markets in Asia will provide the main impetus for growth in world coking coal consumption. This reflects high projected growth in iron and steel production that is expected to be underpinned by strong demand growth associated with rapidly increasing incomes. In comparison, coking coal demand in the more developed economies is projected to maintain a relatively flat profile in response to subdued growth in demand for steel.

Demand for imported coal in Europe is forecast to fall by about 10 million tonnes by 2010, representing an annual decline in coal imports of 0.8 per cent. This figure does not include additional imports that could arise if subsidies to the European coal sector were phased out.

ABARE's modeling indicates that if the remaining coal production subsidies in Europe were removed over the period to 2010, coal production would fall substantially in those economies, with production in Germany affected most because of relatively high subsidy rates. In the European

Union, thermal coal imports are projected to rise by an additional 9 million tonnes in 2010 following the removal of subsidies.

There are, however, potentially important risk factors that could affect the generally positive outlook for world coal demand. Prolonged economic weakness in key economies, including the United States and Japan for example, could lead to significantly lower world economic growth. This would have a negative impact on coal demand and trade.

The imposition of more stringent environmental standards on coal production and use represents a further downside risk to ABARE's coal demand projections in the period to 2010. Within this framework, the implementation of international policy responses to the threat of global climate change will be particularly relevant. The entry into force of the Kyoto Protocol would penalise coal use relative to other energy sources in countries that have adopted greenhouse gas emission reduction targets.

Competition in international coal markets

Australian producers have a competitive advantage in supplying coal to the Asian region. For example, the landed price of Australian thermal and coking coal in Japan was US\$34.59 and US\$39.01 a tonne respectively in 2000, which compares favorably

3 Coal exports to Asia, by major exporters

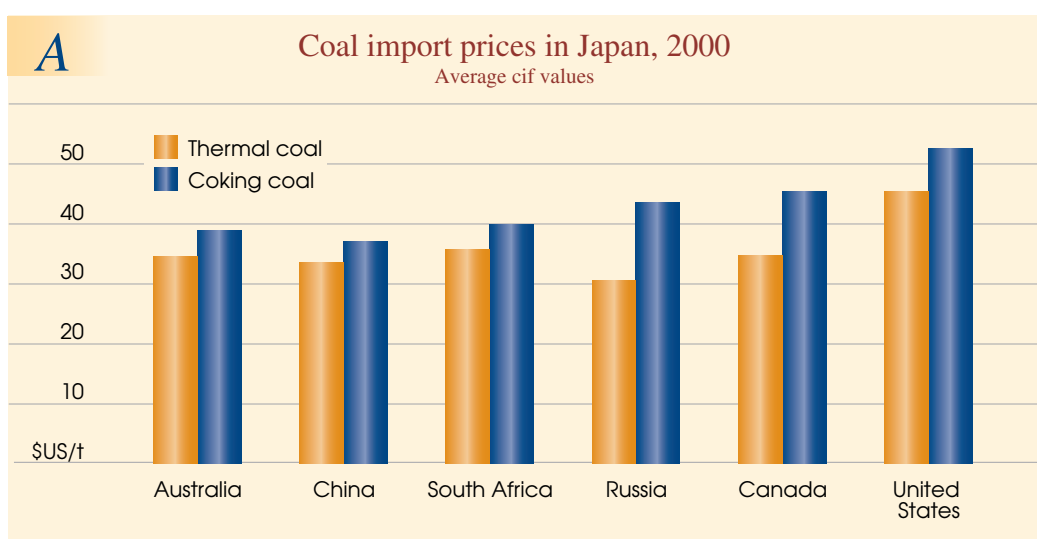
	1990		2000	
	Exports	Share	Exports	Share
	Mt	%	Mt	%
Australia	79.8	46	143.8	46
South Africa	19.7	11	14.5	5
United States	20.0	11	5.7	2
China	14.0	8	51.6	17
Indonesia	4.5	3	47.0	15
Russian Federation	9.8	6	8.7	3
Other	26.8	15	38.7	12
Total Asian imports	174.7	100	309.9	100

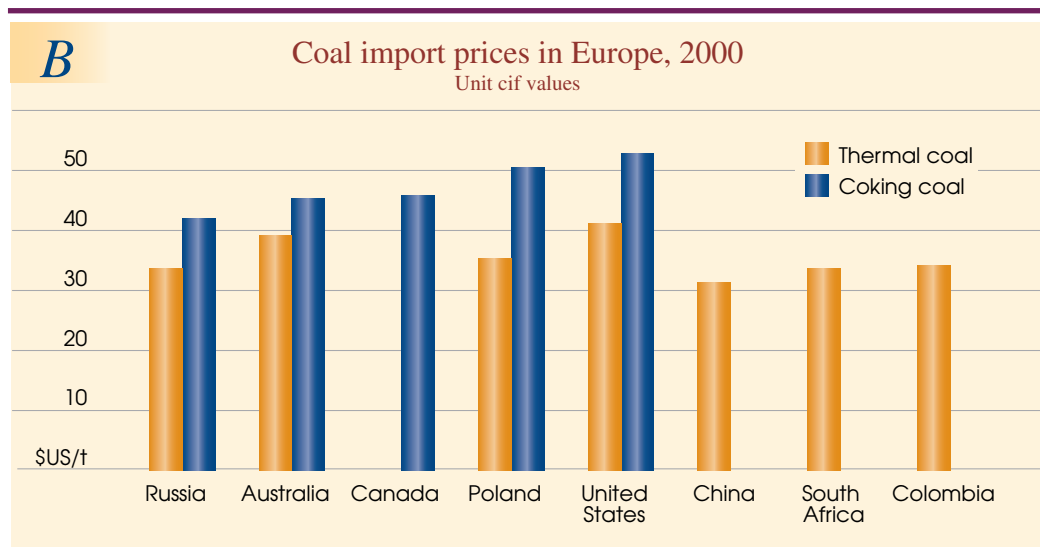
Source: IEA (2001).

with other exporters to Japan (figure A). Most of this advantage is derived from highly efficient coal mining operations and close proximity to Asian demand centres.

However, Australian coal exporters have encountered increasing competition over the past decade from other coal exporters in the Asian region, most notably from Indonesia and China (table 3).

Indonesia's thermal coal exports to Asia increased from 4.5 million tonnes in 1990 to 47 million tonnes in 2000, primarily as a result of extensive marketing efforts to





heighten the acceptance of lower priced, high moisture, low energy sub-bituminous coal.

China's exports of coal to Asia have also grown rapidly, from 14 million tonnes in 1990 to nearly 52 million tonnes in 2000. This trend of rising coal exports from China is expected to continue, with total export volumes estimated to rise to around 87 million tonnes in 2001.

As shown in table 1, China is the world's largest coal producer with output of almost 1.2 billion tonnes in 2000. China exports only a small fraction of this production (around 4.7 per cent in 2000) but accounts for about 17 per cent of coal traded in the Asian region. The potential for Chinese producers to capitalise further on their vast coal reserves and proximity to the Asian market is significant.

Australia is less competitive in landing thermal coal in Europe, owing to the greater transport distance relative to competing exporters such as South Africa, Colombia and the Russian Federation. The landed price of Australian thermal coal in Europe was about US\$39 a tonne in 2000, substantially above most other competitors.

However, Australia remains a competitive exporter of coking coal to Europe, as South Africa, Colombia and the Russian Federation are unable to supply the required coal tonnages (figure B). In addition, Canada, a major competitor for Australian producers in the Asian coking coal market

for many years, is a relatively high cost producer of coal. Canada's inland transport costs per tonne are significantly higher than Australia's because of greater distances and difficulties in transporting Canadian coal to port — up to 1000 kilometres through mountainous country.

In Canada the closure of three metallurgical coal mines in 2000 led to a significant reduction in exports in 2000. The absence of substantial expansion plans in the Canadian coal industry suggests that market competition from Canada has eased.

Competitiveness of Australia's coal industry

A range of factors affects the competitiveness of Australian coal supply. These include mining costs, the efficiency of inland haulage networks and export terminals and proximity to major markets.

Mining costs

Mine operating costs account for a significant proportion of final export costs, ranging from 50 to 80 per cent in most Australian mines in 1999. Labor costs (the main component of mine operating costs) per employee increased across the Australian coal mines sector over the 1990s. For example, in real terms (in 2000 dollars), these costs increased from around A\$71 200 per employee to A\$108 200 per employee between 1990 and 2000 (IEA 2001). Despite

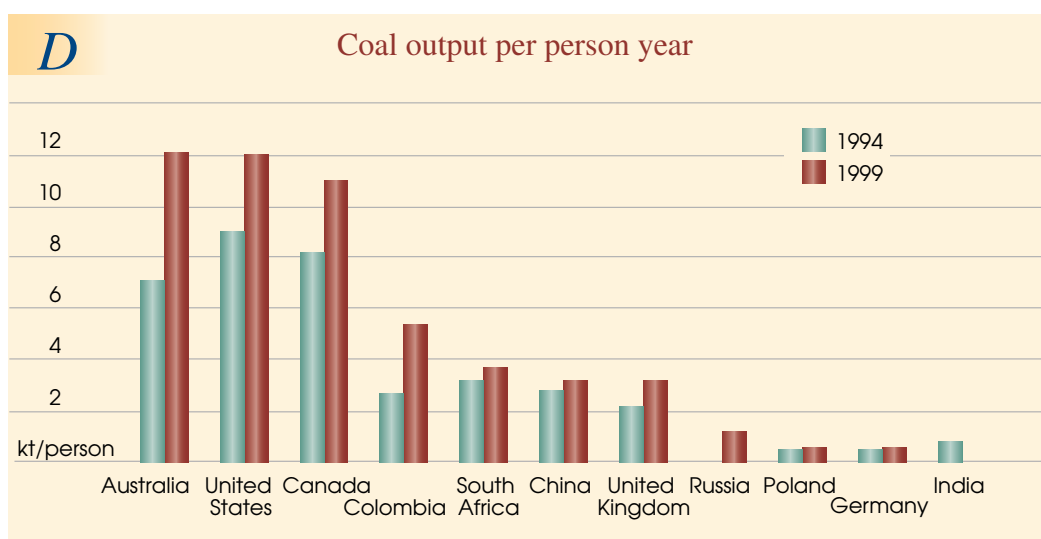


these increases, average mine operating costs have fallen as a result of significant productivity gains (IEA 2001).

Over the period 1996–2000, mine site productivity, measured in terms of run of mine output per person year, has increased at an average rate of 11 per cent a year in Australia (figure C). These productivity gains were underpinned by the adoption of new technologies, marked changes in work practices, head office rationalisation and the outsourcing of noncore businesses. Australia's run of mine coal output per person year compares favorably with competing coal exporters (figure D).

New technologies have increased the capital intensity of Australian mines, thereby increasing output per employee. For surface mines, greater use of automated dragline systems has increased labor productivity substantially. The increased use of automated longwall and high wall mining techniques has had similar benefits in the underground sector.

Productivity gains have also been boosted through industry consolidation. In recent years, ownership of Australian coal assets has been consolidated into the control of fewer companies. For example, Glencore, already with a strong presence in Australia,



acquired 90 per cent of the Ulan Mine assets at the beginning of 2001 from Exxon Coal and Minerals. In addition Coal and Allied (Rio Tinto) acquired all of Peabody's coal assets in Australia and bought Esso's Lemington coal mine, while RAG Coal International increased its position in Australia through the takeover of a majority stake in the North Goonyella mine (IEA 2001).

Consolidation of the coal industry has also occurred at the global level, with major companies striving to reduce mining costs through strategic mergers and acquisitions. The merger of BHP and UK based Billiton to form BHP Billiton in 2001 is the most recent significant example. Principally, consolidation has increased mine productivity by increasing the average mine size and facilitating changes to work practices.

Average mine size has risen as a result of the closure of smaller mines and the amalgamation of adjacent mines. This has also allowed superior use of existing mine infrastructure, with some capital equipment being transferable between mines under the same ownership.

Changes of ownership have also promoted changes in work practices at mine sites and some rationalisation of management and ancillary service operations. Reforms to industrial relations legislation have also provided companies with more flexibility in organising worksite arrangements.

In 2000 the world's largest ten coal companies accounted for a major share of production in a number of countries (figure E). Most of these coal companies were also shareholders in port facilities (IEA 2001).

Coal mining costs are also affected by mining royalties. State governments in Australia charge firms for mining coal, as the resources are the property of the state. In New South Wales, royalties are levied at \$1.70 a tonne of raw coal mined, with discounts available for coals with high moisture content. A 50 cents a tonne surcharge on coal mined at some of the state's large opencut pits is imposed, bringing royalty payable on these leases to around \$2.20 a tonne.

In contrast, Queensland coal mining royalties are 7 per cent of the value of salable coal at the coal mine gate. There are proposals in Queensland to change the calculation of the royalty from the value at the mine gate to the value of coal loaded on ship for export. This would significantly increase the royalty paid by the coal industry in Queensland.

Under Commonwealth taxation legislation no GST is payable on royalty payments.

Inland transport costs

Inland transport costs in Australia have declined in recent years. For example, these costs for Queensland surface coking coal operations have fallen in real (2000) terms from US\$9.87 a tonne in 1994 to between US\$3.90 and US\$6.50 in 2000 (IEA 1995, 2001).

The downward trend in inland transport costs is largely a result of increases in the efficiency of rail services. Efficiency gains have been achieved predominantly through the introduction of competitive mechanisms to these previously noncompetitive state run monopolies. Coal producers are now able to negotiate rail freight contracts with a range of service providers.

Following the corporatisation of New South Wales coal freight services in 1997, FreightCorp (the new New South Wales government coal freight carrier) is now being privatised. It is reported that since corporatisation, freight rates have fallen by an average of 25 per cent (ILN 2000a).



Australian coal ports

Port charges and loading costs in Australia have also declined in recent years. For example, these costs for Queensland surface coking coal operations have fallen in real (2000) terms from US\$3.37 a tonne in 1994 to between US\$1.70 and US\$2.60 in 2000 (IEA 1995, 2001). Mirroring trends at the mine site, port costs have fallen over time as the scale of facilities has increased, and as new equipment and technologies have been adopted and reforms to work practices have increased operational efficiencies.

Most of Australia's coal export terminals are owned by state governments. However, similar to developments in rail haulage, reforms are under way to increase competition between export terminals in order to bolster the competitiveness of the Australian coal industry. Reflecting this reform process, Queensland's Dalrymple Bay terminal was privatised in mid-2001.

There are currently five coal export terminals in Queensland: Brisbane (with a capacity of 5 million tonnes a year), Gladstone (35 Mtpa); Hay Point (40 Mtpa), Dalrymple Bay (40 Mtpa) and Abbot Point (12 Mtpa). New South Wales has three coal export terminals: Port Kembla (16 Mtpa), Carrington (25 Mtpa) and Kooragang Island (64 Mtpa). New South Wales has a total coal port capacity of about 105 million tonnes a year and Queensland 132 million tonnes a year.

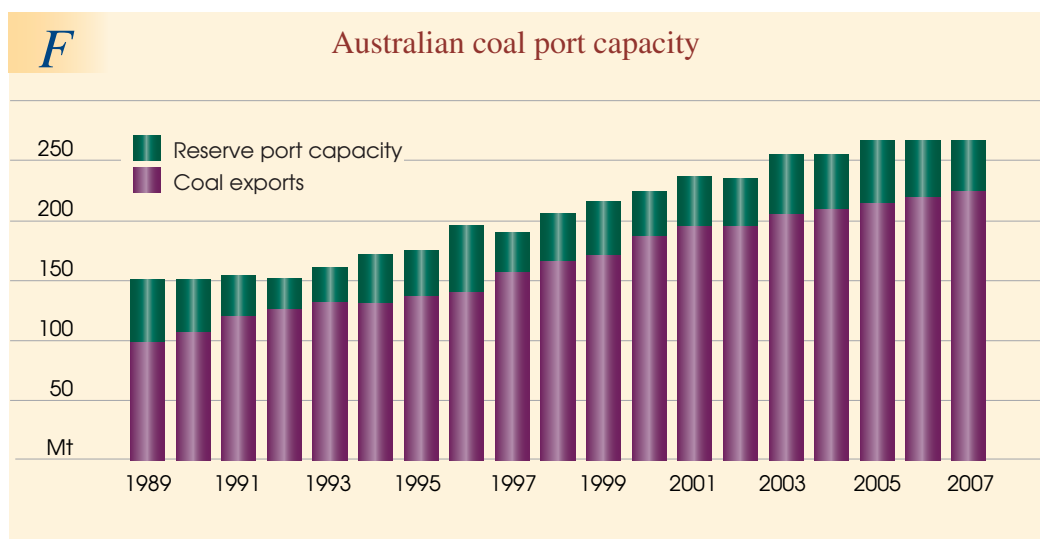
Australia's total coal export port capacity of 237 million tonnes a year is 42 million tonnes higher than estimated exports in 2001. Despite this significant spare capacity, additional coal port capacity is required to allow expansion of Australian coal exports (figure F).

Kooragang Island terminal recently expanded capacity to 64 million tonnes, with expenditure of \$345 million during 2001 (Port Waratah Coal Services Limited, www.pwcs.com.au/kooragang_expansion.html). Expenditure of a further \$200 million after 2001 is expected to lift capacity at the Kooragang terminal to 75 million tonnes a year.

In Queensland there are plans under way to expand capacity at the Gladstone and Dalrymple Bay export terminals. At Gladstone, the addition of a third loading berth is expected to increase capacity by around 5 million tonnes to about 40 million tonnes a year by 2003. The capacity of the Dalrymple Bay terminal will reach 44 million tonnes in 2002, an increase of 4 million tonnes. Current plans indicate the intention of expanding the capacity of this facility by an additional 10 million tonnes in 2003.

Maritime transport

Freight costs are also an important determinant of Australia's overall competitive position. Freight rates for seaborne coal depend on a range of factors, including: size and age



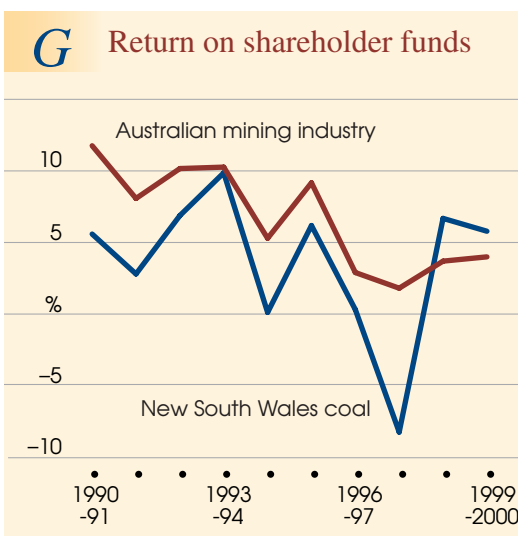
of vessel, haulage distances, crude oil prices, and demand for freight services from coal and other bulk sectors including iron ore and grains.

Bulk freight rates have declined over the past decade primarily because of an increase in average vessel size. For example, the cost of shipping coal from Queensland to Japan in capesize vessels fell in real (2001) terms from US\$7.06 a tonne in late 1990 to US\$3.95 in late 2001.

The proximity of Australia to the markets with the most positive growth prospects (namely, Asia) provides Australia with a distinct location advantage relative to traditional coal exporting countries such as the United States, Canada and South Africa. However, as discussed above, strong demand growth has also supported the emergence of new supply from within the Asian region.

Investing in Australian coal

An industry will only attract the funds required to expand if it can provide a competitive return on those funds. The percentage return on average shareholder funds before abnormals and extraordinary items is calculated for the Australian minerals industry and the New South Wales coal industry by PricewaterhouseCoopers on behalf of the Minerals Council of Australia and the New South Wales Minerals Council (figure G).



The data indicate that the New South Wales coal industry consistently earned lower returns for shareholders on funds invested than the aggregate Australian minerals industry for the period 1990-91 to 1997-98. However, since 1997-98 there has been a marked improvement in profitability in the New South Wales coal industry when measured against this indicator. For both 1998-99 and 1999-2000, returns on shareholder funds for the New South Wales coal industry have been positive and above the Australian mining industry average.

The after tax return on shareholder funds fell in 1999-2000, in part owing to the fall in US dollar contract coal prices negotiated for that year (New South Wales Minerals Council 2001). However, the increase in negotiated contract coal prices and the sharp depreciation of the Australian dollar are likely to have boosted profitability in 2000-01. In support of this, the average export unit value of coal rose by 18 per cent from \$47.20 a tonne to \$55.81 in 2000-01. However, foreign currency hedging contracts may have resulted in some exporters not receiving the full benefit of the lower Australian dollar.

The improved financial performance of the coal sector led to a number of public share offerings in early 2001, including the Centennial Coal and Macarthur Coal floats, and augurs well for future investment in Australian coal export capacity.

Future Australian coal mine capacity

ABARE recently updated its list of planned new coal mine projects in Australia (see the following article in this issue of *Australian Commodities*). The 25 black coal projects identified in the list are at various stages of development, ranging from feasibility study to projects under construction. Estimated capital costs, mine type and projected new annual capacity are listed for each of the projects.

The total new production capacity of the listed black coal projects indicates that there is a potential 116 million tonnes of additional production capacity. However, the past record of industry planning and development indicates that not all projects on the list are expected to proceed to production in the

foreseeable future. Some will require improved market conditions and market access while some will encounter unexpected delays or may be aimed at the same market opportunity. A proportion of new supply will also serve as replacement capacity for mines with depleted economic reserves.

However, offsetting the effects of these uncertainties to some extent are potential new projects or expansions from sources not identified in this survey. The expectation of additional production from yet to be announced sources is reasonable given the tendency of some companies not to announce expansion plans until they are well advanced.

The combined annual capacity of projects assessed as being at least at either the committed or under construction stage is about 42 million tonnes (table 4). Projects at these stages of development are assessed as having a high probability of being commissioned in the medium term. The combined capital cost of these projects is estimated at \$2.4 billion.

Coal exports are projected to rise by 46 million tonnes to 242 million tonnes in 2010. This increase would represent an annual growth in production of about 2 per cent. This rate of growth is less than the 4.6 per cent growth achieved between 1991 and 2000, when economies in Asia were growing more strongly than is forecast for the next decade.

The combined capacity of committed or under construction projects in New South Wales is 30.9–31.9 million tonnes, while the total in Queensland is 10.7 million tonnes. The cost of the New South Wales and Queensland projects is estimated to be around \$1.7 billion and \$0.8 billion in current dollars respectively.

Almost half the additional capacity in New South Wales will be for thermal coal, for both the domestic and export market, including combined expenditure of \$967 million on the Mount Arthur North project (with an estimated capacity of 6.3 million tonnes by 2003 rising to 14.5 million tonnes a year by 2006), the Dartbrook extension

4 Committed coal investment projects in Australia

	Location	Expected startup	Capital expenditure	Capacity	Main coal type	Main market
			\$m	Mt		
New South Wales						
Beltana longwall	Near Wollongong	2002	na	6	Coking	Export
Glennies Creek longwall	12 km NW of Singleton	2002	200	3	Coking	Export
Tahmoor longwall	Near Wollongong	2004	100	1.6	Coking	Export
Southland Colliery restructure	Hunter Valley	2003	150	2	Coking	Export
Dartbrook extension	10 km NW of Muswellbrook	2002	57	4	Thermal	Export
Mandalong	35 km SW of Newcastle	2002	120	3–4	Thermal	Domestic
Mount Arthur North	5 km SW Muswellbrook	2003	790	6.3	Thermal	Domestic
Dendrobrium underground	Kamira Valley, West of Wollongong	2005	242	5	Coking	Domestic
Total			1 659	30.9–31.9		
Queensland						
Blackwater expansion	80 km S of Emerald	2001-02	130	5.5	Coking	Export
Hail Creek opencut	85 km W of Mackay	2003	425	2.2	Coking	Export
Millmerran opencut	5 km S of Millmerran	2002	200	3	Thermal	Domestic
Total			755	10.7		
Total			2 414	41.6–42.6		

na Not available.

project (4 Mtpa) and the Mandalong project (3–4 Mtpa). These projects are expected to use predominantly opencut mining techniques.

The remaining five mines will have a strong focus on coking coal production and will rely predominantly on underground longwall mining techniques. These mines include the Beltana longwall project (with a capacity of 6 Mtpa), Glennies Creek longwall (3 Mtpa), the Tahmoor expansion project (1.6 Mtpa), the Southland colliery restructure project (2 Mtpa), and the Dendrobrium longwall project (5 Mtpa). Combined capital expenditure on these mines is expected to be at least \$692 million.

In Queensland three new mines are expected to be commissioned by 2007, all of which are planned to be opencut operations. The 5.5 million tonnes a year Blackwater coking coal expansion project and the 3 million tonnes a year Millmerran domestic thermal coal project are both under construction. These two projects alone are estimated to cost \$330 million. The 2.2 million tonnes a year Hail Creek coking coal project, with a capital cost of \$425 million, has been committed to construction by the owners, Rio Tinto.

A substantial proportion of planned thermal coal projects remain uncommitted at this stage and have less probability of being commissioned in the medium term. Some of these projects have received all government approvals to proceed. For example, in Queensland a number of thermal coal projects for domestic purposes have been put on hold while the state assesses its commitment to an expansion of gas fired power. These projects include the Aceland opencut, Meandu opencut and the Wandoen opencut projects.

Conclusion

The proximity of Australia to the Asian region provides a competitive advantage in landing coal in these rapidly growing coal import markets relative to the traditional coal exporting countries of the United States, Canada and South Africa. However, this growth has also encouraged the emergence of new export coal supply from within the Asian region. China and Indonesia in par-

ticular have developed significant coal export industries in the past decade that compete with Australian producers in the Asian region.

But Australia remains well placed to benefit from the projected increases in world coal demand. Coal mining costs have decreased as a result of industry consolidation, the adoption of new mining technologies and techniques and workplace reforms. The costs of transporting coal to port and ship loading have also declined significantly with the introduction of competitive mechanisms to these formerly state run monopolies and workplace reforms. These factors have maintained the international competitiveness of Australian coal exports.

Reflecting this competitive position, there are a substantial number of planned development projects that will add significantly to Australia's coal export capacity in the medium term.

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Minerals and energy

Major development projects

Ian Haine and commodity analysts, Industries Branch



Despite the poor short term outlook for global growth and minerals and energy commodity prices, there are current indications of upturns in both mineral exploration and capital expenditure, with positive implications for the future pace of growth of Australia's minerals and energy sector.



In addition, the recent commitment to several medium and large scale projects, together with the existence of several other large, but as yet uncommitted, projects undergoing serious study, are further positive developments for sector growth in the medium to longer term.

List of projects

The table at the end of this article is a listing of the larger Australian mining, minerals processing and minerals infrastructure projects that are planned to be developed over the medium term. The table updates information published in the June 2001 issue of *Australian Commodities*.

With one industry exception, the table provides details of announced projects for which total capital expenditure is expected to exceed \$40 million (in 2001-02 dollars). The exception is the gold industry, which typically has a relatively large number of smaller projects. For gold, the expenditure threshold for inclusion in the table is \$15 million.

Project stage

In general, projects identified are at relatively advanced stages of planning. That is, for new projects, stage of planning categories range from 'feasibility study underway' through to 'under construction', ignoring a range of 'possible' projects at earlier stages of consideration. However, in a few cases where it is considered informative to demonstrate a more complete picture of the range of development proposals for certain commodities at this time, some significant projects at earlier planning stages (for example 'prefeasibility study underway') have been included.

Projects are listed by the principal mineral commodity to be produced, under the broad headings: 'Mining projects – energy', 'Mining projects – minerals' and 'Minerals processing facilities'. Also, with the focus being on projects planned to commence

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production over the next few years, projects at the more advanced stages of planning — that is, those identified as ‘committed’ or ‘under construction’ — are grouped together and listed first within each principal commodity segment. These projects appear in the lighter shaded areas of the table.

Projects that are at less advanced planning stages (for example, those at feasibility study stage) follow within each commodity segment and appear in the darker shaded areas. Where available, details of employment expected to be generated at the ‘construction’ and ‘operational’ phases of new or expanded projects have been included in the table.

The table includes new greenfields projects as well as expansions of existing projects. For both, expected additional annual production capacity has been identified, as well as total expected capital expenditure — including the costs of construction, plant and equipment — in current dollars as reported by the company.

The sum of identified increases in annual production capacity should not be interpreted as the expected net additions to Australian minerals production capacity. Some projects will not proceed as planned. Also, as always, there will be closures of some existing mines or processing facilities over the next five years, as they reach the end of their economic lives.

Exploration expenditure

It is important to recognise that the ability of Australia’s minerals and energy sector to sustain its strong recent growth and expand its contribution to national economic performance in the medium and longer terms depends critically on levels of investment in minerals exploration. Most of the strong growth in the minerals and energy sector of recent years, and most of the expected growth implicit in this list of planned projects, is underpinned by minerals exploration expenditure in the past decade.

The trend in Australian minerals exploration expenditure, in real terms (2001-02 dollars), for the period 1980-81 to 2000-01 is shown in figure A.

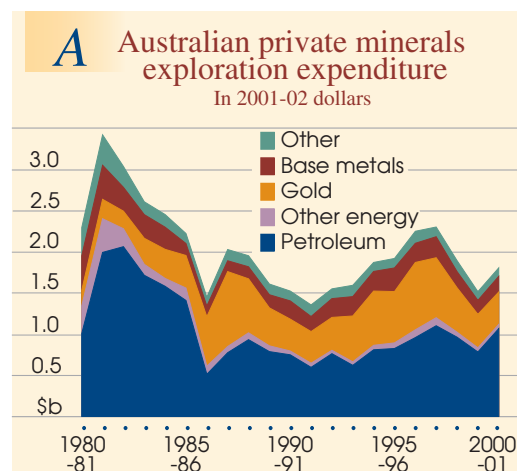
In 2000-01, total Australian minerals exploration expenditure rose strongly: by 26

per cent to \$1.77 billion. This substantial rise followed two years of sharp declines, with expenditure in 1999-2000 reaching its lowest level since 1991-92.

The sharp turnaround in total minerals exploration expenditure in 2000-01 was predominantly driven by a 44 per cent rise in petroleum expenditure, as expenditure on nonenergy exploration increased by only 6.7 per cent. Within the nonenergy minerals sector, expenditure on base metals rose by 12 per cent while expenditure on gold and other minerals both rose by less than 3 per cent.

Petroleum exploration expenditure in 2000-01 was \$1044 million, over 80 per cent of which related to offshore exploration. Total petroleum exploration expenditure in 2000-01 was the highest in real terms (apart from 1997-98) since the early to mid-1980s, a period in which petroleum prices were relatively high. Similarly, the increased expenditure in 2000-01 is considered to at least partly reflect the incentive provided by sustained high oil prices in the two years to June 2001.

The small rise in gold exploration expenditure in 2000-01 followed falls in each of the three previous years. In real terms, expenditure on gold has declined by 52 per cent since its peak in 1996-97 and, at around \$394 million in 2000-01, is at its lowest level since 1991-92. For much of the 1990s, gold dominated nonenergy exploration expenditure and in 2000-01 gold still accounted for almost 60 per cent of the total. However, relatively low prices and a subdued price



outlook, resource access problems, reduced access to investment funds, an increased focus on resource acquisition, and the attractions of exploration in some overseas locations, continue to be dampening influences on gold exploration in Australia.

The rise in base metals exploration expenditure in 2000-01 mainly reflected a 46 per cent increase in spending on zinc-lead-silver exploration; expenditure on copper rose by 15 per cent but nickel exploration expenditure remained about the same as in 1999-2000.

Data from the Australian Bureau of Statistics' recent survey of expected minerals exploration expenditure in the period July-December 2001 indicated that expenditure for both minerals and petroleum exploration was likely to increase significantly. For petroleum, the survey indicated that expenditure in the six months July-December 2001 was expected to be 35 per cent greater than that in July-December 2000. On the same basis, expenditure on other commodities was expected to be up 21 per cent.

While this is encouraging, these survey results should be interpreted with caution. The ABS survey was conducted prior to the events of 11 September and is therefore likely to reflect exploration expenditure intentions based on views of prices and general global economic conditions somewhat different from those faced soon after the terrorist attacks. For example, world oil prices fell sharply in the wake of the attacks and fell even further in the period to early December 2001. In addition, the outlook for oil and metal prices and global economic growth in 2002 is significantly weaker than expected prior to 11 September 2001.

To the extent that factors such as these influence short term decisions on exploration expenditure, then realised expenditure for July-December 2001 is likely to be lower than the survey indicated.

Looking further out, over the medium term, exploration expenditure in each of the main exploration sectors is expected to be influenced by a different set of factors.

In the petroleum sector, the level of oil prices over the medium term will be a key factor in determining future levels of exploration activity and expenditure. For gold,

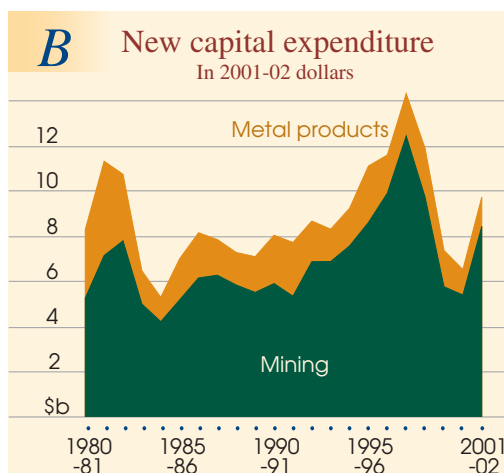
factors such as continued uncertainty about sales by central banks and the associated subdued outlook for gold prices will be important.

In the base metals sector, the price outlook will clearly be important, as will a range of other factors including the apparent trend toward company rationalisation/out-sourcing of exploration capacities (not only in Australia but also globally), the perceived need on the part of many Australian producing companies to take steps to increase shareholder returns (particularly during a period in which companies are potentially vulnerable to takeovers) at the expense of exploration expenditure, and Australia's relative attractiveness for exploration.

Capital expenditure

Data from the ABS surveys of new capital expenditure in the mining and metal products industries give an indication, in aggregate terms, of the pace and scale of development in the minerals and energy sector, both historically and going forward in the short term.

ABS survey data show that new capital expenditure in the mining industry was \$5.2 billion in 2000-01, marginally less than in 1999-2000. In real (2001-02 dollar) terms new capital expenditure was the lowest since 1991-92 (figure B). This outcome follows sharp falls in expenditure in each of the two previous years. In 2000-01, capital expenditure on mining was less than half the record in 1997-98 (\$12.4 billion, in real terms), and



among the lowest in the past twenty years. (It should be noted, though, that the three years up to and including 1997-98 was an unusually intensive period of development).

However, there are strong indications that capital expenditure on mining may rise significantly next year. Based on industry intentions canvassed in the December quarter 2001, ABS data indicate that capital expenditure on mining in 2001-02 may be around \$8.4 billion — about 60 per cent up on estimated 2000-01 expenditure. It should be noted that the survey was conducted after the September terrorist attacks in the United States, with the implication that the subsequent weaker world economic and price outlook has been factored into expenditure expectations.

Capital expenditure in the metal products sector, which includes the minerals processing activities covered in this projects list, was \$1.1 billion in 2000-01, 26 per cent below 1999-2000 expenditure and the lowest, in real terms, since 1984-85. However, surveyed industry intentions provide an initial indication of a possible 18 per cent increase in metal products expenditure in 2001-02.

If the expenditure intentions for both the mining and metal products sectors are realised, total capital expenditure in the mineral resources sector could rise by 50 per cent in 2001-02.

Looking beyond the short term, there is some evidence to suggest that there is potential for further recovery in resource sector capital investment. This assessment is based on the observation that the number of advanced projects listed in the following table has increased and that there now exists a number of high quality and large scale, but less advanced, projects that may be developed in a longer timeframe.

Recently commissioned projects

In the six months ending December 2001, only five major minerals and energy projects were completed. This low rate of project completions is the same as that of the previous six month period (January-June 2001). The estimated total capital cost of the five projects commissioned in the six months to December 2001 was \$262 million, similar to

that of the projects commissioned in the six months to June (\$282 million).

These figures represent a significant decline in both rate of project completions and in average project value compared with the previous two years. In 2000, eighteen projects, valued at around \$3.6 billion, were completed and in 1999 a record 35 projects, valued at almost \$11 billion, were commissioned. However, it should be borne in mind that the two years to the end of 1999 was an extraordinarily intensive period of minerals and energy sector development in Australia. Given the shock of the Asian economic downturn in 1998, limitations on companies' capacity to raise finance and to service debt beyond certain levels, and the finite number of projects available for development, it is perhaps not surprising that project completions in the sector have declined.

Among the major projects completed in the six months to December 2001, the largest in terms of capital cost was Nardell Coal's new Nardell underground coal mine in the Hunter Valley. The mine was developed at a capital cost of \$150 million and is expected to produce between 2.75 and 3 million tonnes a year of semisoft coking and thermal coal for export.

Two new gold mines — Cobar Central opencut (Peak Gold Mines) in New South Wales and the Lewis mine (Gympie Gold) in Queensland — were brought into production in the six months to December 2001. Each was developed at a capital cost of \$35 million. The Lewis mine, together with an existing operation (El Dorado), reestablishes Gympie as an important goldfield. The Lewis mine is expected to produce around 65 000 ounces of gold a year at full production.

LionOre's new Emily Ann nickel sulphide mine commenced production in November. It is located in the Lake Johnson area of Western Australia and is one of the few greenfields nickel deposits to come on stream in recent years. The mine, developed at a capital cost of \$42 million, is expected to reach full annual output capacity of 6700 tonnes of nickel in concentrate in the first quarter of 2002.

(Having come on stream, the above projects no longer appear in the list of planned projects).

Minerals and energy projects

Advanced projects

In the table of planned minerals and energy projects that follows, 33 projects at advanced stages of development — that is, projects that are either committed or under construction — are listed.

Of the current list of advanced projects, seventeen are scheduled to be completed in 2002, while sixteen have announced completion dates beyond 2002. (However, some projects scheduled to be completed in 2002 may slip into the following year).

If the seventeen projects earmarked for completion in 2002 are brought into production as planned, it would represent a significant turnaround both in numbers (only ten projects were completed in 2001) and in the average capital cost of completed projects — an estimated \$186 million in 2002, compared with an average of just \$54 million in 2001.

Importantly, the number of advanced projects now scheduled to be completed within the next five years (33) compares reasonably favorably with numbers in this category recorded in earlier periods. This may reflect an increasingly positive outlook for some commodity markets over the next five years and beyond.

The 33 advanced projects in this list indicate continued expansion across most of the minerals and energy industry spectrum. However, in terms of capital expenditure,

there is a heavy weighting toward petroleum and coal projects. The announced capital expenditure of these 33 advanced projects sums to \$14.3 billion. Around 80 per cent of this amount relates to mining and petroleum developments as there are only three mineral processing projects, valued at around \$2.9 billion, that have reached an advanced stage.

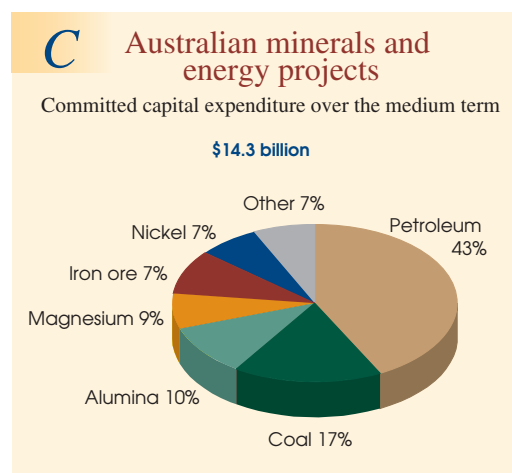
Figure C provides the breakdown of proposed capital expenditure on advanced projects, by major commodity grouping, while figure D shows their location.

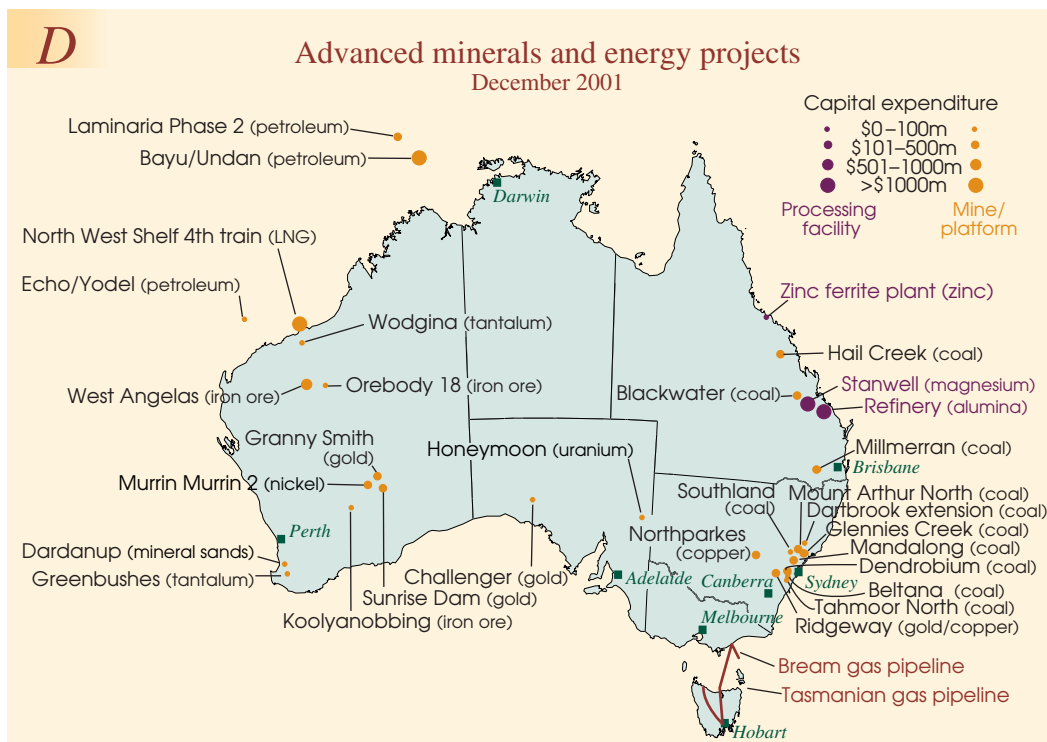
It should be borne in mind that even projects that have reached the committed stage may be deferred, modified or even cancelled if economic or competitive circumstances change sufficiently.

Of the seventeen major projects scheduled to be commissioned in 2002, a few stand out in terms of capital cost, scale of development and potential contribution to national mineral output.

The largest of these in capital cost is Robe River's new, \$880 million, West Angelas iron ore mine in the Pilbara, expected to be commissioned in the second half of 2002. The development of the West Angelas mine is expected to include upgrades to the existing port and port handling facilities at Cape Lambert. The initial annual output from West Angelas will be 7 million tonnes of Marra Mamba ore but the mine may eventually produce 20 million tonnes a year.

Three petroleum projects are expected to be completed in 2002 and all are scheduled to be in operation around mid-year. Duke Energy's \$440 million, 753 kilometre, Tasmanian Gas Pipeline, from Longford in Victoria across Bass Strait to Hobart and Port Latta, will bring natural gas to Tasmania for the first time. The capacity of the pipeline will be 40 petajoules a year. Woodside Energy is the operator of the other two petroleum projects due for completion in mid-2002. One of these is the \$205 million Echo-Yodel gas and condensate field on the North West Shelf which is expected to produce 37 million barrels of condensate and 11.3 billion cubic metres of natural gas over a four to five year period. The other is the Laminaria phase 2 development that is expected to contribute an additional 65 000 barrels of oil a day (50 per cent of current





capacity) from the existing Laminaria/Corallina operation.

Development activity in the coal mining industry is increasing, with six projects scheduled for completion in 2002. Collectively, the capital expenditure for these coal developments is around \$770 million and their combined additional coal output is expected to be around 25 million tonnes a year at full capacity. Four of these projects are in New South Wales and include Shell's Dartbrook extension, Namoi Hunter's Glennies Creek longwall and Powercoal's new Mandalong mine, all in the Hunter Valley. Enx's new Beltana longwall mine near Wollongong is the largest of the coal mine developments and is expected to have a production capacity of 6 million tonnes a year. Of the two Queensland projects, BHP Billiton's Blackwater mine expansion, near Emerald, is expected to be in operation early in 2002. Normandy Mining's new Millmerran opencut mine is located in the Darling Downs region.

The four gold mine developments scheduled to be completed in 2002 are expected to add almost 1 million ounces (30 tonnes)

to Australia's annual gold output capacity. Expansions to Placer Dome's Granny Smith mine and AngloGold's Sunrise Dam Megapit, both in Western Australia, are expected to contribute 700 000 ounces of this increase. The combined capital cost of these two developments is \$360 million. Newcrest's new Ridgeway mine, near Orange in New South Wales, is being built at a capital cost of \$376 million and is expected to produce around 240 000 ounces of gold a year, as well as 24 000 tonnes of copper in concentrate. South Australia's first stand-alone gold mine — Dominion Mining's new Challenger mine, near Tarcoola — is expected to begin production in the second half of the year. Challenger's annual output capacity will be 50 000 ounces of gold.

Of the advanced projects expected to be completed beyond 2002, two of the recently committed major development proposals are particularly noteworthy. These are Comalco's \$1.5 billion alumina refinery project and Australian Magnesium Corporation's \$1.3 billion Stanwell magnesium proposal, both in central Queensland. Both are notable for several reasons, including:

the significant scale of investment and production involved; both are the first large scale mineral processing projects committed for some time; and each has been subjected to extensive feasibility study (and considerable uncertainty) over several years before commitment.

In addition, the proposed AMC magnesium plant is likely to be the pioneer magnesium metal operation in Australia (several others are currently under serious consideration) and will use production technology developed and tested in Australia. Annual output from the Stanwell plant will be 97 000 tonnes of magnesium metal, a commodity for which world demand is expected to increase substantially in the medium to longer term.

The Comalco alumina refinery is expected to produce 1.4 million tonnes of alumina a year from 2005.

Commitment to both the alumina refinery and the magnesium plant boosts the potential market for natural gas in Queensland and may have an influence on considerations with respect to the proposed PNG to Queensland gas pipeline development.

Less advanced projects

It is not intended that the project information in this article provide a basis for estimating total planned capital expenditure, particularly for the following projects at the less advanced planning stages (those not listed as committed or under construction). Apart from the fact that capital expenditure details are not available for some of these projects, the principal reason for caution is that there remains significant uncertainty about whether such projects will actually proceed over the medium term.

Projects in the less advanced planning category are either still undergoing feasibility study (in some selected cases, prefeasibility study), or no definite decision has been taken on development following the com-

pletion of a feasibility study. Some of these projects cannot proceed for some years and may confront changed economic or competitive conditions, or may be targeting the same emerging market opportunity, necessitating rescheduling. In addition, securing finance for project development — even for high quality projects that would have a high probability of success — can present problems, particularly in periods when there is perceived to be excess global supply and/or an uncertain demand outlook.

However, despite the uncertainty that attaches to projects at these earlier stages of consideration, they provide a useful indication of the nature and extent of the platform for future development of the minerals and energy sector.

There are nine significant projects at less advanced planning stages that are new to the list. Total potential capital expenditure of these project additions is around \$5.8 billion. The largest of the projects new to the list is a \$2.04 billion gas to liquid fuels plant, primarily to produce environmentally clean diesel fuel from natural gas, proposed by the Sasol Chevron Global Joint Venture. Possible locations for the plant are the north west of Western Australia or the Northern Territory. It should be noted that this is one of several chemical and petrochemical projects, based on Australia's gas resources on the North West Shelf and the Timor Sea, proposed for the region.

Other large projects include a possible \$1.2 billion expansion of Alcan's Gove alumina refinery in the Northern Territory and a \$1 billion expansion of Comalco's Boyne Island aluminium smelter at Gladstone in Queensland. The Gove alumina project aims to produce an additional 1.2 million tonnes of alumina a year and is currently at feasibility study stage. The Boyne Island smelter proposal is undergoing prefeasibility studies.

Mining projects – energy ^a

Project	Company ^b	Location	Status ^c	Expected startup	New capacity ^d	Capital expend. ^e	Employment ^f
Black coal							
<i>New South Wales mines</i>							
Beltana longwall	Enx	near Wollongong	New project, under construction	2002	6 Mt	na	na
Dartbrook extension	Shell	10 km NW of Muswellbrook	Expansion, under construction	2002	4 Mt	\$57m	30 O
Dendrobium underground	BHP Billiton	Kemira Valley, W of Wollongong	New project, under construction	2002-03 longwall by 2005	5 Mt	US\$126m (A\$242m)	170 O
Glennies Creek longwall	Namoi Hunter (Tomen Corporation)	12 km NW of Singleton	Expansion, under construction	2002	3 Mt by 2005	\$200m	140 O
Mandalong	Powercoal (Pacific Power)	35 km SW of Newcastle	New project, under construction	2002	3–4 Mt	\$120m	200 O
Mount Arthur North	Coal Operations Australia	5 km SW of Muswellbrook	New project, committed	2002-03	6.3 Mt by 2003 14.5 Mt by 2006	US\$411m (A\$790m)	500 C 300 O
Southland colliery	Thiess	Hunter Valley	Restructure of mining operations, committed	2003	2 Mt	\$150m	na
Tahmoor north underground longwall	Austral Coal	near Wollongong	Expansion, under construction	2004	1.6 Mt	\$100m	210 C
Airly Mountain underground	Centennial Coal	42 km NW of Lithgow	New project, feasibility study underway	na	0.75–1.0 Mt	na	80–100 O 60 C
Glendell opencut	Liddell (Enx)	17 km NW of Singleton	New project, feasibility study underway	2003	3 Mt	\$100m	85 O
Carrington open pit extension (to Hunter Valley No 1)	Coal and Allied (Rio Tinto)	25 km NW of Singleton	Expansion, development consent granted	2002	3.75 Mt	\$100m	235 C 145 O
Maules Creek opencut	Coal and Allied (Rio Tinto)	20 km NE of Boggabri	New project, mining lease granted. On hold over medium term	na	6.5 Mt	\$450m	300 O
Mt Pleasant opencut	Coal and Allied (Rio Tinto)	5 km W of Muswellbrook	New project, mining lease granted	2003-04	10.5 Mt	\$310m	250 C 330 O

Project	Company b	Location	Status c	Expected startup	New capacity d	Capital expend. e	Employment f
Queensland mines							
Blackwater	BHP Billiton	80 km S of Emerald	Expansion, under construction	2001-02	5.5 Mt	\$130m	nil
Hail Creek opencut	Hail Creek JV (Rio Tinto)	85 km W of Mackay	New project, committed	2003	2.2 Mt initially, rising to 5.5 Mt by 2005	\$425m	na
Millmerran opencut	Normandy Mining	5 km S of Millmerran	New project, under construction	2002	3 Mt	\$200m	100–120 O
Acland opencut	New Hope Coal Australia	15 km N of Oakey	New project, on hold	na	2 Mt	na	300 C 120 O
Clermont opencut	Clermont Coal Mines (Mitsubishi)	11 km N of Clermont	New project, feasibility study completed	2006	10 Mt	\$400m	na
Dawson opencut	Anglo Coal Australia	160 km SW of Rockhampton	New project, mining lease granted. On hold over medium term	na	3 Mt	\$300m	200 O
Goonyella longwall	Central Queensland Coal Assoc.	30 km N of Moranbah	New project, feasibility study underway	2003	Up to 5.5 Mt	\$150m	110–125 O
Grasstree longwall	Anglo Coal Australia	German Creek area	New project, feasibility study underway	2005	4 Mt	na	na
Meandu opencut (Kunioon)	Pacific Coal (Rio Tinto)	15 km W of Nanango	Expansion, feasibility study underway	2003	2.0–2.4 Mt	na	na
Peak Downs opencut expansion	Central Queensland Coal Assoc.	35 km S of Moranbah	Expansion, under review	na	3 Mt	\$280m	nil
Togarah North longwall	Enex	45 km SW of Blackwater	New project, feasibility study underway	na	4.0–5.0 Mt	\$300m	200 O
Wandoan opencut	MIM	60 km N of Miles	New project, on hold	2004	3 Mt	na	na
For further information contact: Robert Curtotti + 61 2 6272 2014							
Brown coal							
Victoria							
Maryvale opencut	Yallourn Energy	Latrobe Valley	New project, feasibility study underway	2004	18 Mt	\$200m	150 C
For further information contact: Robert Curtotti + 61 2 6272 2014							

MINERALS AND ENERGY PROJECTS

Project	Company b	Location	Status c	Expected startup	New capacity d	Capital expend. e	Employment f
Petroleum							
Bayu/Undan LPG/condensate field	Phillips Petroleum	Timor Gap Zone of Cooperation	New project, committed	early 2004	116 kbd condensate and LPG	\$2.7b	1380 C 90 O
Bream gas pipeline	Esso/BHP Billiton	Bream platform to Longford, Vic	New project, committed	mid-2003	na	\$200m	na
Echo/Yodel gas and condensate fields	Woodside Energy	120 km NW of Dampier, WA	New project, under construction	mid-2002	25 kbd	\$205m	na
Laminaria oilfield phase 2	Woodside Energy	Timor Sea	Expansion, under construction	mid-2002	65 kbd	\$130m	na
North West Shelf project extension (fourth train)	Woodside Energy	North West Shelf, WA	Expansion, under construction	LNG by 2004	4.2 Mt LNG	\$2.4b	2000 C 70 O
Tasmanian Gas Pipeline	Duke Energy	Longford, Vic to Tasmania	New project, under construction	mid-2002	40 PJ pa	\$440m	800 C 30 O
Darwin – Moomba gas pipeline	Epic Energy	Darwin, NT to Moomba, SA	New project, under review	2004	na	>\$1b	1400 C
Gas to liquid fuels plant	SASOL/Chevron JV	Burrup Peninsula, WA	New project, feasibility study underway	na	22.7 kbd diesel 7.3 kbd naptha and LPG	\$2.04b	na
Gorgon LNG (staged development, 2 trains ultimately)	Chevron	Carnarvon Basin, WA	New project, feasibility study underway	na	8.6 Mt LNG ultimately	\$8b	4000 (peak) C 300 O
LNG plant	Phillips	Darwin	New project, under review	na	4.8 Mt LNG	\$2.5b	na
Minerva offshore gas production facility	BHP Petroleum	Otway Basin, Vic	New project, on hold	na	16 PJ pa	\$160m	220 C 20 O
Patricia/Baleen gas field	OMV Australia	Bass Strait, Vic	New project, feasibility study underway	late 2002	11 PJ pa	\$120m	350 C
Pilbara petro-chemical project	Dow	Near Dampier, WA	New project, stage 1 feasibility study completed	na	1 Mt EDC 550 kt MEG 825 kt caustic soda 750 kt chlorine	\$3b	2000 C 500 O
PNG–Qld gas pipeline	Exxon/Mobil	PNG to Qld	New project, feasibility study underway	2006	300 PJ pa	around \$2b (first stage)	1800 C 60 O

MINERALS AND ENERGY PROJECTS

Project	Company b	Location	Status c	Expected startup	New capacity d	Capital expend. e	Employment f
Stuart oil shale plant (stage 2)	Stuart Energy JV	Gladstone, Qld	New project, under review	na	14.8 kbd	\$450m	na
Sunrise Gas Project (incl Sunrise and Troubador gas fields)	Woodside Energy	500 km NW of Darwin, NT	New project, feasibility stage	2006	(260 billion cubic metres reserves)	\$2.5b	na
Sweetwater gas to liquids plant	Syntroleum Corporation	Burrup Peninsula, WA	New project, feasibility study underway	2002-03	580 ML per year synthetic hydrocarbons	\$1b	1000 C 80 O
Syngas and methanol plant	Methanex	Darwin	New project, under review	na	110 PJ pa	\$1.5b	1000 C 150 O
Victoria – SA gas pipeline	Duke Energy/ GPU GasNet	Vic to SA	New project, feasibility study underway	2003	45 PJ pa	\$250m	na
Victoria – SA gas pipeline	Origin Energy/ ANP	Vic to SA	New project, feasibility study underway	2003	na	\$230m	na
Vincent/ Enfield oil project	Woodside Energy	50 km N of Exmouth, WA	New project, feasibility study underway	2005	na (probable reserve 125 million bbl)	na	na
Yolla LPG/ condensate field	Australia Worldwide Exploration	Bass Strait	New project, feasibility study underway	2003	40 ktpa LPG 22 kbd condensate	\$400m	na
For further information contact: Ian Haine + 61 2 6272 2031							
Uranium							
Honeymoon	Southern Cross Resources	420 km NE of Adelaide, SA	New project, committed	2002-03	0.5–1.0 kt U3O8	\$20m	na C 40 O
Jabiluka	ERA (Rio Tinto)	230 km E of Darwin, NT	New project, on hold	na	1 kt U3O8	\$70m	110 O
For further information contact: Ian Haine + 61 2 6272 2031							
Mining projects – minerals a							
Cobalt							
Browns polymetallic project	Compass Resources/ Guardian Resources	Near Batchelor, NT	New project, feasibility study underway	2004	3.4 kt Co cathode 71 kt Pb bullion 12.5 kt Cu cathode 1.95 kt Ni hydroxide	\$300m	450 C 200 O
For further information contact: Ian Haine + 61 2 6272 2031							

MINERALS AND ENERGY PROJECTS

Project	Company b	Location	Status c	Expected startup	New capacity d	Capital expend. e	Employment f
Copper							
Northparkes expansion (lift 2)	Rio Tinto	Near Parkes, NSW	Expansion, under construction	2003	no increase – replacement for lift 1	\$139m	na
Ridgeway	Newcrest	Near Orange, NSW	New project, under construction	2002	24 kt Cu 240 000 oz Au	\$376m	450 C 200 O
Maroochy-dore	Straits Resources/ Murchison	Pilbara region, WA	New project, pre-feasibility study underway	na	30 kt Cu cathode	na	na
Nifty sulphide resource	Straits	Pilbara region, WA	New project, feasibility study underway	2003	50–70 kt Cu in concentrates or SX/EW Cu cathode	na	160 C 90 O
Olympic Dam expansion	WMC	Roxby Downs, SA	Expansion, feasibility study underway	2003	35 kt Cu	\$83m	na
Tritton (Bonnie Dundee)	Nord Resources	22 km SW of Girilambone, NSW	New project, feasibility study completed. On hold	na	18 kt Cu	\$45m	na C 120 O
Selwyn mine expansion	Selwyn Mines	160 km SE of Mt Isa	Expansion, feasibility study underway	2002	22 kt Cu 55 000 oz Au	\$13m	na
For further information contact: Peter Berry + 61 2 6272 2120							
Gold							
Challenger mine	Dominion Mining	Near Tarcoola, SA	New project, under construction	late 2002	50 000 oz	\$17m	70 O
Granny Smith Wallaby ext.	Placer Dome/ Delta	WA	Expansion, under construction	2002	400 000 oz	\$150m	300 C 300 O
Ridgeway	Newcrest	Near Orange, NSW	New project, under construction	2002	240 000 oz Au 24 kt Cu	\$376m	450 C 200 O
Sunrise Dam MegaPit expansion	AngloGold	WA	Expansion, under construction	early 2002	300 000 oz	US\$58m (A\$110m)	100 C 280 O
Ballarat	Ballarat Goldfields	Vic	New project, prefeasibility study completed. On hold	na	100 000 oz	\$65m	180 O

Project	Company b	Location	Status c	Expected startup	New capacity d	Capital expend. e	Employment f
Cowal	Homestake Resources	NSW	New project, feasibility study completed. On hold	na	200 000 - 250 000 oz	\$220m	300 C 200 O
Gwalia Deeps	Sons of Gwalia	WA	Expansion underground, feasibility study underway	2005-06	150 000 – 200 000 oz	\$100m	na
New Bendigo	Bendigo Mining	Vic	New project, feasibility study underway	2003	90 000 – 100 000 oz	\$40–50m	70 C 200 O
Paulsen's	Taipan	WA	New project, feasibility study completed. On hold	2002	100 000 oz	\$35m	na
Peak Hill sulphide project	Alkane	Peak Hill, NSW	Expansion, feasibility study underway	2003-04	30 000 oz	\$10–20m	na
Telfer expansion	Newcrest	Pilbara region, WA	Expansion, feasibility study underway	na	na	\$250m	na
White Foil	Cogema SA/ Goldfields Ltd	WA	New project, feasibility study underway	2002	100 000 oz	na	na
For further information contact: Anthony Simms + 61 2 6272 2403							
Iron ore							
Koolya-nobbing	Portman	Koolya-nobbing WA	Expansion, under construction	2004	5.5 Mt (rolling expansion)	\$100m	120 C 35 O
Orebody 18	BHP	Pilbara, WA	New project, further construction deferred	na	5 Mt initially, 10 Mt eventually	\$50m (initial capacity only)	200 C 100 O
West Angelas	Robe River (Rio Tinto)	Pilbara, WA	New project, under construction	2nd half 2002	7 Mt initially, 20 Mt eventually	\$880m	1200 C 330 O
Fortescue	Austeel	Fortescue 80 km SW of Karratha, WA	New project, prefeasibility underway	2005	20 Mt iron ore 6 Mt pellets 4.6 Mt DRI	\$3b	na C 600 O
Hope Downs	Hancock Prospecting/ Iscor	Pilbara, WA	New project, feasibility study underway	na	15–25 Mt	\$0.4–1.6b	500 C 200 O
Mining Area C	BHP/ POSCO (Pohang Iron and Steel)	Pilbara, WA	New project, feasibility study underway	2003-04	5–10 Mt initially, up to 15 Mt eventually	\$350m	500 C 200 O

MINERALS AND ENERGY PROJECTS

Project	Company b	Location	Status c	Expected startup	New capacity d	Capital expend. e	Employment f
Nammuldi	Hamersley Iron (Rio Tinto)	Pilbara, WA	New project, feasibility study underway	na	2–3 Mt initially, up to 20 Mt eventually	\$300m	400 C 150 O
For further information contact: Andrew Maurer + 61 2 6272 2134							
Lead–zinc–silver							
Bowden's silver project	Silver Standard Australia	25 km ESE of Mudgee, NSW	New project, on hold	na	124 t Ag in concentrate	\$75m	200 C 60–80 O
Dugald River	Pasminco	85 km NE of Mount Isa, Qld	New project, on hold	after 2003	na	\$250m	na
Hellyer metals project	Western Metals	90 km S of Burnie, Tas	New project, on hold	na	24 kt Zn 93 t Ag 100 000 oz Au	\$90m	na
Mount Garnet (incorporating Surveyor 1)	Kagara Zinc	105 km SW of Cairns, Qld	New project, feasibility study completed	2002	35 kt Zn in concentrates	\$43m	na
Lady Loretta	Lady Loretta JV (Noranda Pacific/Buka Minerals)	140 km NW of Mt Isa, Qld	New project, feasibility study underway	na	125 kt Zn 50 kt Pb 850 000 oz Ag	\$200m	na
Magellan lead project	Magellan Metals (Ivornia West)	Near Wiluna, WA	New project, feasibility study completed	2002	55 kt Pb metal	\$26m	na
For further information contact: Peter Berry + 61 2 6272 2120							
Mineral sands							
Dardanup	Doral Mineral Industries	Dardanup, WA	New project, under construction	2002	100–115 kt ilmenite and leucoxene; 8–10 kt zircon	\$40m	60 C 60 O
Douglas	Basin Minerals	40 km SW of Horsham, Vic	New project, final feasibility study nearing completion	2003	180 kt ilmenite 75 kt zircon 30 kt rutile 15 kt leucoxene	\$90m	180 C 180 O
Gingko	BIP Joint Venture (BeMax/Probo)	NSW (120 km N of Mildura)	New project, EIS and feasibility study underway	2003	55 kt rutile 40 kt zircon 165 kt ilmenite 100 kt altered ilmenite	\$167m	na
Goondicum	Monto Minerals	Burnett River, Qld	New project, feasibility study underway	2002	275 kt ilmenite	\$40m	60 O

Project	Company b	Location	Status c	Expected startup	New capacity d	Capital expend. e	Employment f
Jangardup South	Cable Sands	Jangardup South, WA	New project, EIS and feasibility study underway	2003	250 kt mineral sands concentrates	\$40m	100 C 50 O
Mindarie	Southern Titanium	Near Loxton, SA	New project, final feasibility study completed	2002	17.5 kt rutile 43.7 kt zircon 76.6 kt ilmenite 14.8 kt leucoxene	\$65m	na
For further information contact: John Hogan + 61 2 6272 2056							
Nickel							
Murrin Murrin 2	Anaconda Nickel	45 km E of Leonora, WA	Rolling expansion, under construction	2003	55 kt Ni 4.5 kt Co	\$1b	2529 C 479 O
Cosmos Deeps	Jubilee Mines	50 km N of Leinster, WA	New project, committed	2003	10 kt Ni	\$33m	na
Cawse 2	Centaur/Anaconda Nickel	50 km NW of Kalgoorlie, WA	Expansion, on hold	2003	40 kt Ni 1 kt Co	na	na
Marlborough	Preston Resources	70 km NW of Rockhampton, Qld	New project, feasibility study completed. On hold	na	25 kt Ni 2 kt Co	\$688m	1000 C 300 O
Mt Keith	WMC	S of Wiluna, WA	Expansion, feasibility study underway	na	22 kt Ni	\$300m	na
Mt Margaret	Anaconda Nickel	100 km NW of Murrin Murrin, WA	New project, feasibility study underway	2003	64 kt Ni 3.6 kt Co	\$2.0b	2529 C na O
Ravens-thorpe	QNI/BHP Billiton	35 km E of Ravens-thorpe, WA	New project, feasibility study underway	2003	35 kt Ni 1.3 kt Co (in concentrates – feed for Yabulu refinery)	\$720m	1100 C 380 O
Syerston	Black Range Minerals	80 km NW of Parkes, NSW	New project, feasibility study completed	2003	42 kt mixed nickel/cobalt sulphide; and platinum conc	\$493m	1000 C 280 O
For further information contact: Andrew Maurer + 61 2 6272 2134							
Rare earths							
Mt Weld	Lynas Corp/Anaconda Industries	Meenaar and Mt Weld, WA	New project, feasibility study nearing completion	late 2002	5–7.5 kt rare earth oxides	\$80m	150 C 105 O

MINERALS AND ENERGY PROJECTS

Project	Company b	Location	Status c	Expected startup	New capacity d	Capital expend. e	Employment f
Pinjarra rare earth plant	Rhodia Pinjarra	Pinjarra, WA	New project, on hold	na	15 kt rare earth nitrates 23 kt tricalcium phosphate	\$60m	150 C 50 O
For further information contact: John Hogan + 61 2 6272 2056							
Tantalum							
Greenbushes underground mine and plant upgrade	Sons of Gwalia	Greenbushes, WA	New project, under construction	2002	600 000 lbs tantalum	\$65m	na
Wodgina mine expansion	Sons of Gwalia	100 km S of Port Hedland, WA	Expansion, under construction	2002	500 000 lbs tantalum	\$35m	na
Dalgaranga project	Tantalum Australia JV (AGM/Kemet)	Dalgaranga, WA	New project, prefeasibility study underway	na	na	\$40m	na
For further information contact: Ian Haine + 61 2 6272 2031							
Vanadium							
Balla Balla	Renewable Energy Corporation	100 km SW of Port Hedland, WA	New project, feasibility study underway	na	6 kt vanadium pentoxide	\$100m	400 C 90 O
For further information contact: Ian Haine + 61 2 6272 2031							
Other commodities							
Ammonia	Burrup Fertilisers	Burrup Peninsula, WA	New project, feasibility study completed	na	720 kt ammonia	\$600m	500 C 60 O
Ammonia/urea plant	Plenty River Corporation	Burrup Peninsula, WA	New project, feasibility study underway	2002	760 kt urea 190 kt ammonia	\$800m	1000 C 120 C
Ant Hill manganese project	HiTec Energy	Port Hedland, WA	New project, feasibility study completed	2002	40 kt electrolytic Mn dioxide 15 kt Mn sulphate	\$209m	na C 75 O
Dubbo zirconia project	Alkane Exploration	Toongi, 20 km S of Dubbo, NSW	New project, feasibility study nearing completion	2003	3.5 kt zirconia 1.5 kt rare earths 0.9 kt Nb/Ta	\$50–70m	300 C 60 O
Exmouth (limestone/quicklime)	Exmouth Limestone	Cape Range, near Exmouth, WA	New project, on hold	na	1 Mt limestone 200 kt quicklime	\$45m	150 C 40 O

Project	Company b	Location	Status c	Expected startup	New capacity d	Capital expend. e	Employment f
Munni Munni PGM project	Helix Resources/ Lonmin	WA	New project, feasibility study underway	na	100 000 oz PGM's and gold 5 kt Cu and Ni	\$71m	na
Wickepin (kaolin)	WA Kaolin	Near Wickepin, WA	New project, feasibility study completed	na	250 kt kaolin	na	na

For further information contact: Ian Haine + 61 2 6272 2031

Minerals processing facilities

Alumina

Comalco alumina refinery project	Comalco	Gladstone, Qld	New project, committed	2005	1400 kt alumina	\$1.5b	1500 C 400 O
Nabalco refinery expansion	Alcan	Gove, NT	Expansion and plant optimisation, feasibility study underway	2006	1200 kt	\$1.2b	1000 C 100 O
QAL refinery expansion	Queensland Alumina	Gladstone, Qld	Expansion, feasibility study underway	2004	1200 kt alumina	na	na
Wagerup refinery expansion – unit 3	Alcoa of Australia	Darling Ranges, WA	Expansion, feasibility study completed	na	1100 kt alumina	\$1b	1500 C 250 O

For further information contact: Michael Peel + 61 2 6272 2073

Aluminium

Aldoga smelter	Aldoga Aluminium	Aldoga, near Gladstone, Qld	New project, feasibility study underway	2005	500 kt	\$3b	3500 C 900 O
Boyne Island smelter expansion	Comalco	Gladstone, Qld	Expansion, prefeasibility study underway	na	170 kt	\$1b	na
Kurri Kurri aluminium smelter	VAW	Kurri Kurri, NSW	Efficiency improvements, feasibility study underway	2005	20 kt	\$250m	na

MINERALS AND ENERGY PROJECTS

Project	Company b	Location	Status c	Expected startup	New capacity d	Capital expend. e	Employment f
Kurri Kurri aluminium smelter (fourth potline)	VAW	Kurri Kurri, NSW	Expansion, feasibility study underway	2008	140 kt	\$850m	na
For further information contact: Michael Peel + 61 2 6272 2073							
Crude iron and steel							
Cold rolling mill	Protech	Newcastle, NSW	New project, feasibility study underway	na	500 kt sheet steel	\$520m	700 C 365 O
HiSmelt plant	Rio Tinto	Kwinana, WA	New project, feasibility study underway	2003	500 kt iron	\$300m	na
Hunter specialty steel mini mill	Boulder Group, Australian Overseas Resources	Newcastle, NSW	New project, feasibility study underway	na	260 kt specialty steel	US\$425m (A\$815m)	340 O
Maitland Steel slab and HBI plant	Australian United Steel Industries	Pilbara, WA	New project, feasibility study completed	na	3.6 Mt DRI	\$1.9b	2000 C 300 O
Newcastle integrated steel plant (linked to Fortescue iron ore project)	Austeel	Newcastle, NSW	New project, prefeasibility study underway	na	3.85 Mt steel	\$2.5b	900 O
Oakajee Mid West iron and steel project	Kingstream Steel	Oakajee, WA	New project, feasibility study completed	na	2.6 Mt steel	\$2.7b	2000 C 775 O
Pig iron plant	Australian Bulk Minerals	Port Latta, Tas	New project, feasibility study completed. On hold	na	0.5–1 Mt pig iron	\$120m	na
South Australian Steel and Energy pig iron project	Auiron	Cooper Pedy or Whyalla, SA	New project, feasibility study underway	2003	2.5 Mt pig iron	\$1b	2000 C 500 O
For further information contact: Andrew Maurer + 61 2 6272 2134							
Magnesium							
Stanwell magnesium project	Australian Magnesium Corporation	Stanwell, near Rockhampton, Qld	New project, committed	2004	97 kt magnesium metal	\$1.3b	1350 C 350 O
Anaconda magnesium project	Anaconda	Near Murrin Murrin, 45 km E of Leonora, WA	New project, prefeasibility study underway	na	100 kt magnesium metal	\$1b	na

Project	Company b	Location	Status c	Expected startup	New capacity d	Capital expend. e	Employment f
Batchelor magnesium project	Mount Grace Resources/ MINTEX/ Anglo American	85 km S of Darwin, NT	New project, feasibility study underway	na	12.5 kt magnesium metal (stage 1)	\$127m	150 O 66 C
Hazelwood magnesium project	Hazelwood Power	150 km E of Melbourne, Vic	New project, prefeasibility study underway	na	34 kt magnesium metal	\$270m	na
PMMA project	Pilbara Magnesium Metal Associates	Pilbara, WA	New project, prefeasibility study underway	na	50 kt magnesium metal	\$700m	na
South Australia magnesium project	Samag (Pima Mining/RFC)	Port Pirie, SA or New Zealand	New project, feasibility study nearing completion	2004	65 kt magnesium metal/alloy	\$750m (US\$375m)	700 C 280 O
Tasmanian magnesium project	Bass Resources	Bell Bay, Tas	New project, prefeasibility study underway	na	80 kt magnesium metal	\$800m	na
Woodsreef magnesium project	Pacific Magnesium Corporation	Woodsreef, NSW	New project, feasibility study underway	na	80 kt magnesium metal/alloy	\$681m	na
For further information contact: Ian Haine + 61 2 6272 2031							
Nickel							
Yabulu refinery expansion	BHP Billiton	Townsville, Qld	New project feasibility study underway	2003	35 kt Ni 1.3 kt Co (linked to Ravensthorpe mining project)	\$300m	na
For further information contact: Andrew Maurer + 61 2 6272 2134							
Silicon							
Australian silicon project	Quaestus	Lithgow, NSW	New project, feasibility study completed	na	31.5 kt silicon metal 10 kt silica fume	\$165m	300 C 140 O
For further information contact: Ian Haine + 61 2 6272 2031							
Titanium minerals							
Kemerton TiO ₂ pigment plant	Millennium Inorganic Chemicals	Kemerton, WA	Expansion, on hold	na	95 kt TiO ₂ pigment	\$470m	500 C 200 O
Kwinana TiO ₂ pigment plant	Tiwest JV	Kwinana, WA	Three stage expansion, on hold	na	85 kt TiO ₂ pigment	\$200m	200 C 65 O
For further information contact: John Hogan + 61 2 6272 2056							

MINERALS AND ENERGY PROJECTS

Project	Company b	Location	Status c	Expected startup	New capacity d	Capital expend. e	Employment f
Zinc							
Zinc ferrite reprocessing plant	Sun Metals	Townsville, Qld	New project, committed	by 2006	na	\$50m	na
For further information contact: Peter Berry + 61 2 6272 2120							
<p>a Includes projects expected to commence production over the medium term and for which capital expenditure is expected to exceed \$40 million (except for gold projects, for which the expenditure threshold is \$15 million). b Principal operating companies. c Type of project and stage of development — categories of the former include: 'new project' and 'expansion'; categories of the latter include: 'feasibility study underway', 'feasibility study completed', 'committed' and 'under construction'. d Annual incremental capacity expected in terms of contained mineral or product; for example, zinc content in zinc concentrate production or salable coal in coal produced. For oil and condensate kbd ('000 barrels a day) and gas TJ (terajoules a day) and liquid petroleum gas LPG (Mt). e Total capital expenditure as reported by the company in current dollars. Includes cost of development, plant and equipment. f Reported employment. Where possible, project employment has been shown at both the construction phase (shown as 'C' against the employment numbers below) and in the operational phase (shown as 'O'). na Not available.</p>							

commodities

australian



STATISTICAL TABLES

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Abbreviations

kg	kilogram	ha	hectare
t	tonne	bbl	barrel
kt	kilotonne	mbd	million barrels a day
Mt	megatonne	lb	pound
L	litre	oz	ounce
ML	megalitre	ct	carat
GL	gigalitre	fob	free on board
m ³	cubic metre	c	cent
mtu	metric ton unit (10 kg)	gr.eq.	greasy equivalent
dltu	dry long ton unit	SDR	Special Drawing Right
PJ	petajoules	0	nil or a negligible amount
TJ	terajoules		

Rounding

Small discrepancies in total are generally caused by the rounding of components

1 Indexes of prices received by farmers

	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
Crops sector							
Grains							
Wheat	136.3	107.5	100.0	92.1	96.6	112.9	120.5
Barley	143.7	116.6	100.0	87.7	109.2	122.8	126.7
Sorghum	119.0	106.7	100.0	88.1	80.3	91.6	88.7
Oats	112.9	100.3	100.0	63.7	74.9	104.3	102.5
Lupins	106.7	111.8	100.0	79.8	84.8	89.7	95.1
Canola	81.4	75.6	100.0	89.6	75.0	82.1	105.8
Total a	126.1	105.1	100.0	88.8	93.7	105.4	111.9
Cotton	121.3	103.1	100.0	88.4	97.5	94.1	84.5
Sugar	110.2	100.0	100.0	98.7	80.7	73.2	92.4
Hay	102.3	93.6	100.0	98.4	100.0	110.7	na
Fruit	103.0	109.6	100.0	108.7	105.9	104.3	105.9
Vegetables	115.2	100.9	100.0	112.7	104.6	118.1	113.3
Total crops sector	118.2	104.1	100.0	94.6	94.3	103.2	106.6
Livestock sector							
Livestock for slaughter							
Cattle	104.9	93.0	100.0	105.9	119.9	147.6	168.8
Lambs b	116.9	121.4	100.0	103.8	97.4	102.5	117.1
Sheep	85.9	85.0	100.0	85.2	71.5	116.0	135.9
Live sheep for export	98.5	92.7	100.0	94.0	95.3	111.4	143.5
Pigs	122.4	123.2	100.0	94.2	119.3	118.4	129.3
Poultry	99.6	107.2	100.0	94.1	90.9	92.2	97.7
Total	106.5	101.0	100.0	101.2	110.0	128.2	144.7
Livestock products							
Wool	93.3	91.9	100.0	79.3	83.0	120.7	109.9
Milk	108.2	103.4	100.0	96.0	89.8	96.1	102.9
Eggs	101.7	105.2	100.0	85.3	84.0	79.1	80.7
Honey	90.2	101.6	100.0	101.1	94.3	94.3	na
Total	100.8	98.1	100.0	87.7	86.1	104.4	103.6
Store and breeding stock	96.1	89.4	100.0	100.9	105.0	126.0	137.2
Total livestock sector	103.2	98.8	100.0	95.4	99.4	117.9	126.7
Total prices received	111.2	101.6	100.0	95.0	96.6	109.9	115.8

a Total for the group includes commodities not separately listed. b New lamb saleyard indicator weight introduced in July 1995: new weight indicator 18–20 kilograms dressed weight from 1995-96; 16–18 kilograms dressed weight used before 1995-96. p Preliminary. f ABARE forecast. na Not available.

Note: 1 ABARE revised the method for calculating these indexes in October 1999. The indexes for commodity groups are now calculated on a chained weight basis using Fisher's ideal index with a reference year of 1997-98 = 100. Indexes for most individual commodities are based on annual gross unit value of production. 2 Prices used in these calculations exclude GST.

Source: ABARE.

2 Indexes of prices paid by farmers, and terms of trade

	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
Farmers' terms of trade a	111.9	102.3	100.0	95.0	93.6	99.9	103.8
Materials and services							
Seed, fodder and livestock							
Seed, seedlings and plants	101.1	99.2	100.0	100.6	102.7	105.2	108.7
Fodder and feedstuffs	101.4	98.9	100.0	91.9	90.0	93.6	99.2
Store and breeding stock	96.1	89.4	100.0	100.9	105.0	126.0	137.2
Total	100.0	96.4	100.0	94.7	94.9	102.5	109.3
Fertiliser	98.2	99.2	100.0	102.7	98.6	106.4	106.4
Chemicals and medicines	98.1	99.0	100.0	100.4	101.6	103.3	105.2
Fuel and lubricants	100.4	104.9	100.0	95.2	115.5	138.6	124.7
Electricity	97.7	99.4	100.0	100.7	102.9	108.5	110.1
Maintenance							
Plant and equipment	95.3	97.6	100.0	102.3	106.1	112.0	114.8
Structures	94.6	95.4	100.0	102.8	104.6	109.3	112.0
Total	95.1	96.9	100.0	102.3	105.6	111.1	113.9
Contracts	98.4	99.6	100.0	104.3	107.9	114.4	117.2
Other materials and services	100.1	100.0	100.0	102.3	104.2	108.9	111.6
Total	98.7	98.6	100.0	98.8	101.4	109.1	111.1
Labor	95.1	97.0	100.0	103.7	107.1	110.1	112.8
Marketing							
Freight outwards	98.5	98.6	100.0	100.3	102.5	107.0	109.7
Selling expenses	95.6	95.5	100.0	102.8	105.2	109.3	112.1
Total	96.2	96.1	100.0	102.7	105.0	109.3	112.0
Overheads							
Interest paid	127.9	117.0	100.0	90.6	98.8	111.2	103.8
Rates and taxes	92.2	95.6	100.0	102.1	107.1	112.4	115.2
Insurance	90.8	98.1	100.0	102.8	105.1	109.8	114.2
Other overheads	99.2	100.5	100.0	103.1	104.1	108.7	111.5
Total	109.2	106.4	100.0	96.5	102.5	111.3	109.0
Capital items							
Plant and equipment	97.3	99.0	100.0	103.3	106.6	112.7	115.6
Structures	95.8	96.7	100.0	101.7	103.8	108.9	111.6
Total	97.1	98.7	100.0	103.0	106.1	111.9	114.7
Total prices paid	99.4	99.3	100.0	100.0	103.3	110.0	111.6
Excluding capital items	99.8	99.4	100.0	99.5	102.8	109.6	111.0
Excluding capital and overheads	97.7	97.9	100.0	100.2	102.9	109.3	111.5
Excluding seed, fodder and store and breeding stock	99.3	99.9	100.0	101.0	104.9	111.5	112.0

a Ratio of index of prices received by farmers and index of prices paid by farmers. p Preliminary. f ABARE forecast.

Note: 1 ABARE revised the method for calculating these indexes in October 1999. The indexes for commodity groups are now calculated on a chained weight basis using Fisher's ideal index with a reference year of 1997-98 = 100. 2 Prices used in these calculations exclude GST.

Sources: Australian Bureau of Statistics; ABARE.

3 Farm costs and returns

	Unit	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
Costs							
Materials and services							
Fuel	\$m	1 236	1 253	1 230	1 450	1 670	1 540
Fertiliser	\$m	1 760	1 828	1 905	1 840	1 920	1 946
Chemicals	\$m	1 480	1 520	1 584	1 620	1 680	1 750
Marketing	\$m	2 923	2 712	2 907	3 150	3 226	3 290
Seed and fodder	\$m	2 801	2 998	2 947	2 900	3 320	3 450
Repairs and maintenance	\$m	2 003	2 022	2 070	2 210	2 390	2 470
Other	\$m	2 954	2 961	3 003	3 080	3 295	3 420
Total	\$m	15 157	15 295	15 645	16 250	17 501	17 866
Labor	\$m	2 919	3 006	3 136	3 250	3 360	3 430
Overheads							
Interest paid	\$m	2 115	1 962	1 917	2 014	2 250	2 087
Rent and third party insurance	\$m	360	360	364	372	389	404
Total	\$m	5 395	5 329	5 417	5 636	5 999	5 921
Total cash costs	\$m	20 551	20 624	21 063	21 886	23 500	23 787
Depreciation	\$m	3 256	3 306	3 440	3 535	3 645	3 730
Total farm costs	\$m	23 808	23 930	24 503	25 421	27 145	27 517
Returns							
Gross value of farm production	\$m	28 259	28 367	28 679	30 088	34 266	35 799
Increase in farmers' assets held by marketing organisations a	\$m	790	663	837	364	540	500
Gross farm cash income b	\$m	27 469	27 704	27 842	29 724	33 726	35 299
Net returns and production							
Net value of farm production c	\$m	4 451	4 437	4 176	4 667	7 121	8 282
Real net value of farm production d	index	96.8	96.2	89.4	97.6	140.5	159.4
Net farm cash income e	\$m	6 918	7 080	6 779	7 838	10 226	11 512
Real net farm cash income d	index	72.6	74.3	70.3	79.3	97.7	107.3
Gross value added g	\$m	16 754	16 547	17 373	18 652	17 878	18 200

a Value of payments still to be made to farmers for their output. b Gross value of farm production less increase in farmers' assets held by marketing organisations. c Gross value of farm production less total farm costs. d In Australian dollars. Base: 1987-88 = 100. Deflated by the consumer price index. Base: 1989-90 = 100. e Gross farm cash income less total cash costs. g Chain volume measures at basic prices. Reference year is 1998-99. p Preliminary. f ABARE forecast. Note: Prices used in these calculations exclude GST.

Sources: Australian Bureau of Statistics; ABARE.

4 Australian unit export returns

Annual indexes a	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f		
Farm	105.0	95.7	102.6	93.5	90.9	109.1	114.8		
Forest and fisheries products	134.5	132.8	133.7	131.3	141.3	154.2	151.1		
Total rural	107.4	98.7	105.1	96.6	94.9	112.7	117.7		
Energy minerals	101.5	103.2	106.0	96.8	110.4	140.0	132.9		
Metals and other minerals	95.3	86.9	94.7	92.4	98.8	115.7	108.1		
Total mineral resources	97.5	92.9	98.8	94.0	103.2	125.2	117.8		
Total commodities	100.9	94.8	100.9	94.8	100.2	120.6	117.6		
	1999-00	2000-01			2001-02				
Quarterly indexes b	June	Sep.	Dec.	Mar.	June	Sep. p	Dec. s	Mar. f	June f
Farm	94.8	98.7	108.2	112.5	116.7	117.3	112.8	113.4	114.9
Forest and fisheries products	104.2	121.8	108.0	107.7	110.4	111.1	110.4	107.5	110.0
Total rural	95.8	101.5	108.3	111.4	115.8	116.6	112.3	112.8	114.3
Energy minerals	131.1	141.5	153.0	144.4	155.1	158.8	142.4	134.5	128.2
Metals and other minerals	117.2	120.9	127.7	125.6	126.9	118.7	117.6	115.9	116.1
Total mineral resources	122.7	129.1	137.9	133.1	138.3	135.0	127.6	123.4	120.9
Total commodities	112.6	118.6	126.8	125.2	129.9	128.1	121.9	119.3	118.3

a In Australian dollars. Base: 1989-90 = 100. **b** In Australian dollars. Base: 1994-95 = 100. **p** Preliminary. **f** ABARE forecast. **s** ABARE estimate.

Source: ABARE.

5 Annual exports summary

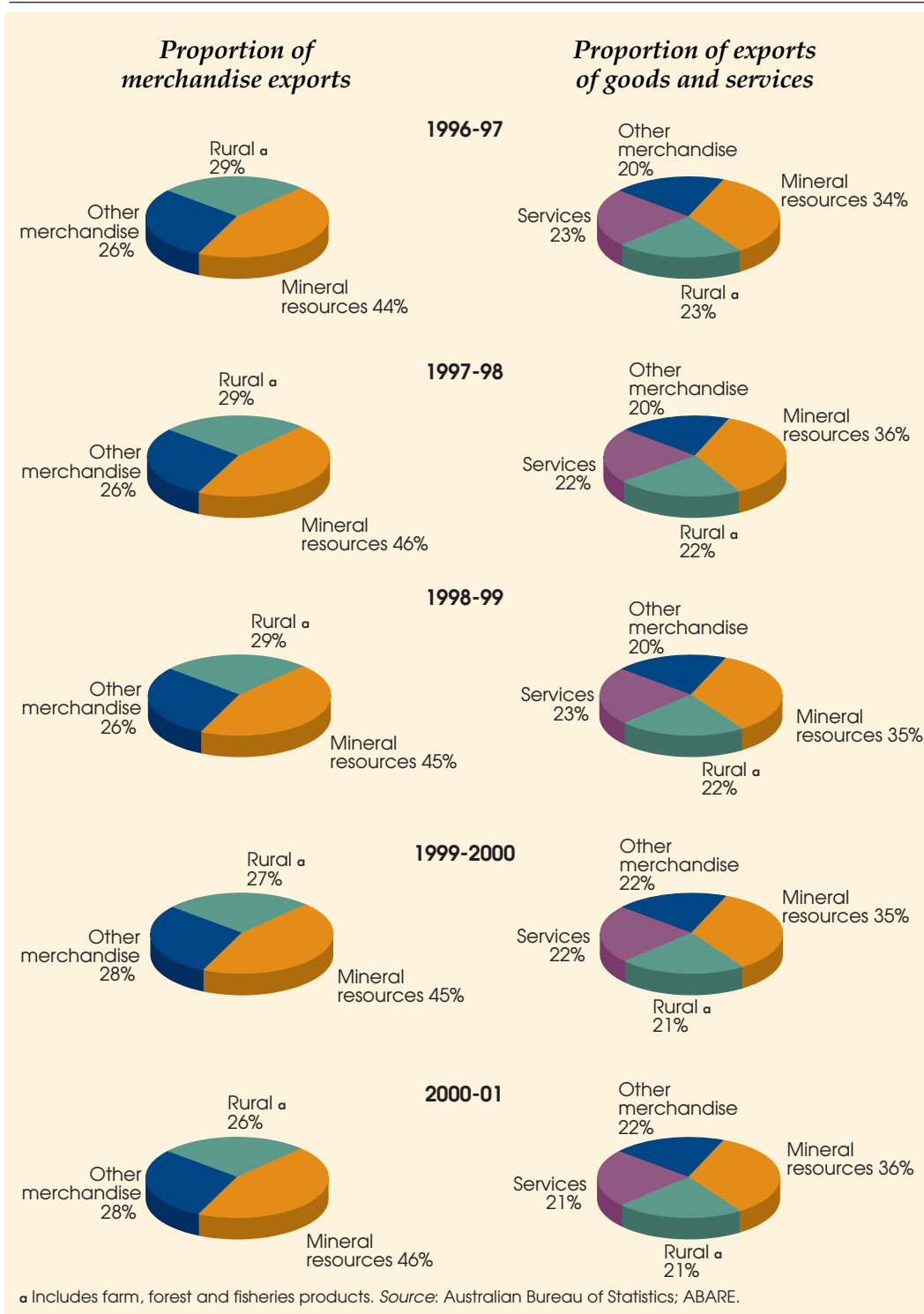
Balance of payments basis

	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
	\$m	\$m	\$m	\$m	\$m	\$m
At current prices						
Rural						
Cereal grains and products	5 954	5 094	5 046	4 941	5 553	6 711
Sugar, products and honey	1 694	1 939	1 472	1 229	1 290	1 344
Meat and meat preparations	2 957	3 731	4 008	4 467	5 795	6 013
Wool and sheepskins	3 744	4 020	2 583	2 963	3 897	3 465
Other rural a	9 339	10 472	11 572	13 089	15 527	16 245
Total	23 688	25 256	24 681	26 689	32 062	33 779
Mineral resources						
Coal, coke and briquettes	8 005	9 586	9 288	8 336	10 843	13 329
Other mineral fuels	5 154	5 309	4 461	9 082	13 454	10 305
Metalliferous ores and other minerals bs	9 803	11 373	11 635	12 361	15 867	15 302
Gold	6 878	7 226	6 413	5 164	5 230	5 710
Other metals	6 054	7 185	6 984	8 810	10 143	10 349
Total s	35 894	40 679	38 781	43 753	55 537	54 995
Total commodities sector s	59 582	65 935	63 462	70 442	87 598	88 774
Other merchandise s	21 352	22 603	22 321	27 213	32 704	na
Total merchandise s	80 934	88 538	85 783	97 655	120 302	na
Services	24 226	25 206	26 242	28 317	32 796	na
Total goods and services	105 160	113 744	112 025	125 972	153 098	na
Chain volume measures c						
Rural						
Cereal grains and products	5 124	4 287	4 951	4 942	4 481	5 064
Sugar, products and honey	1 261	1 349	1 137	1 229	1 012	1 192
Meat and meat preparations	3 626	4 124	4 376	4 467	5 050	5 017
Wool and sheepskins	3 186	2 979	2 524	2 963	3 094	2 620
Other rural a	9 193	9 767	10 990	13 089	13 976	15 302
Total	22 390	22 506	23 978	26 690	27 613	29 195
Mineral resources						
Coal, coke and briquettes	6 931	7 691	7 962	8 337	9 134	9 492
Other mineral fuels	7 192	8 018	7 682	9 083	9 759	10 010
Metalliferous ores and other minerals bs	11 840	11 739	12 270	12 362	13 265	13 921
Gold	6 753	7 280	6 201	5 164	4 712	5 377
Other metals	6 937	7 188	8 012	8 810	8 875	8 991
Total s	39 653	41 916	42 127	43 756	45 745	47 790
Total commodities sector s	62 042	64 422	66 104	70 446	73 358	76 985
Other merchandise s	21 346	22 381	22 205	27 209	30 176	na
Total merchandise s	83 388	86 803	88 309	97 655	103 534	na
Services	25 529	26 130	26 945	28 317	31 271	na
Total goods and services	108 928	112 951	115 256	125 972	134 805	na

a Includes other farm, forest and fisheries products. Includes exports of wine and of paper and paperboard, which are not included in this balance of payments item by the ABS. **b** Includes diamonds, which are not included in this balance of payments item by the ABS. **c** For a description of chain volume measures, see ABS, *Introduction of chain volume measures*, in the Australian National Accounts, cat. no. 5248.0, Canberra. Reference year is 1999-2000. **p** Preliminary. **f** ABARE forecast. **s** ABARE estimate. **na** Not available.

Sources: ABS, *Balance of Payments, Australia*, cat. no. 5302.0, Canberra; ABARE.

6 Contribution to exports by sector Balance of payments basis



7 Quarterly exports summary Balance of payments basis

	1999-00	2000-01				2001-02			
	June	Sep.	Dec.	Mar.	June	Sep. p	Dec s	Mar. f	June f
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
At current prices									
Rural									
Cereal grains and products	1 233	1 311	1 465	1 392	1 385	1 309	1 614	1 998	1 791
Sugar, products and honey	177	521	433	220	116	541	348	228	228
Meat and meat preparations	1 244	1 308	1 498	1 311	1 678	1 718	1 474	1 399	1 422
Wool and sheepskins	818	818	1 115	998	966	919	985	789	772
Other rural a	3 533	3 860	3 908	3 657	4 102	4 264	4 015	3 711	4 254
Total	7 005	7 818	8 419	7 578	8 247	8 751	8 437	8 124	8 466
Mineral resources									
Coal, coke and briquettes	2 251	2 519	2 591	2 564	3 169	3 442	3 314	3 341	3 233
Other mineral fuels	2 910	3 350	3 923	3 112	3 069	3 266	2 691	2 257	2 091
Metalliferous ores and other minerals bs	3 686	3 791	4 114	3 804	4 157	4 082	3 742	3 700	3 778
Gold	1 320	1 230	1 220	1 380	1 400	1 269	1 484	1 486	1 471
Other metals	2 572	2 337	2 680	2 465	2 661	2 565	2 550	2 510	2 724
Total s	12 739	13 227	14 528	13 325	14 456	14 624	13 781	13 294	13 297
Total commodities sector s	19 744	21 046	22 947	20 903	22 703	23 375	22 218	21 418	21 763
Other merchandise s	7 162	7 529	8 479	7 700	8 995	8 465	na	na	na
Total merchandise	26 906	28 575	31 426	28 603	31 698	31 840	na	na	na
Services	6 936	8 866	7 954	8 712	7 264	7 859	na	na	na
Total goods and services	33 842	37 441	39 380	37 315	38 962	39 699	na	na	na
Chain volume measures c									
Rural									
Cereal grains and products	1 168	1 183	1 194	1 087	1 017	985	1 221	1 509	1 349
Sugar, products and honey	173	407	291	142	172	548	375	161	107
Meat and meat preparations	1 167	1 240	1 344	1 139	1 327	1 325	1 239	1 207	1 246
Wool and sheepskins	773	718	887	768	721	702	719	606	594
Other rural a	3 386	3 590	3 557	3 259	3 570	3 587	3 889	3 597	4 228
Total	6 667	7 138	7 273	6 395	6 807	7 147	7 443	7 080	7 525
Mineral resources									
Coal, coke and briquettes	2 178	2 357	2 234	2 187	2 356	2 369	2 354	2 385	2 385
Other mineral fuels	2 431	2 457	2 682	2 369	2 251	2 605	2 550	2 433	2 422
Metalliferous ores and other minerals bs	3 286	3 316	3 394	3 179	3 376	3 416	3 500	3 489	3 516
Gold	1 236	1 144	1 085	1 260	1 223	1 081	1 422	1 437	1 437
Other metals	2 325	2 099	2 316	2 131	2 329	2 384	2 155	2 222	2 230
Total s	11 456	11 373	11 711	11 126	11 535	11 855	11 980	11 967	11 989
Total commodities sector s	18 123	18 511	18 984	17 522	18 342	19 001	19 423	19 047	19 514
Other merchandise s	6 841	7 367	7 720	7 158	7 930	7 409	na	na	na
Total merchandise	24 964	25 878	26 704	24 680	26 272	26 410	na	na	na
Services	6 859	8 517	7 566	8 316	6 872	7 394	na	na	na
Total goods and services	31 817	34 395	34 271	32 996	33 143	33 804	na	na	na

^a Includes other farm, forest and fisheries products. Includes exports of wine and of paper and paperboard, which are not included in this balance of payments item by the ABS. ^b Includes diamonds, which are not included in this balance of payments item by the ABS. ^c For a description of chain volume measures, see ABS, *Introduction of chain volume measures*, in the Australian National Accounts, cat. no. 5248.0, Canberra. Reference year is 1999-2000. ^p Preliminary. ^f ABARE forecast. **na** Not available. Sources: ABS, *Balance of Payments, Australia*, cat. no. 5302.0, Canberra; ABARE.

8 Industry gross value added ^a

	Unit	1995-96	1996-97	1997-98	1998-99	1999-00
Agriculture, forestry and fishing						
Agriculture	\$m	15 513	16 754	16 547	17 373	18 652
Forestry and fishing	\$m	1 306	1 447	1 503	1 534	1 560
Total	\$m	16 819	18 197	18 037	18 898	20 210
Mining						
Mining (excludes services to mining)	\$m	22 613	22 897	23 618	23 905	26 777
Services to mining	\$m	1 673	1 769	1 856	1 739	1 325
Total	\$m	24 123	24 519	25 329	25 461	28 102
Manufacturing						
Food, beverage and tobacco	\$m	12 428	12 603	13 623	14 489	15 392
Textile, clothing, footwear and leather	\$m	3 173	3 146	3 208	3 246	3 044
Wood and paper products	\$m	4 882	4 709	4 761	4 719	5 357
Printing, publishing and recorded media	\$m	6 195	6 566	6 495	6 611	7 012
Petroleum, coal, chemical, etc.	\$m	9 372	9 567	9 817	10 429	10 389
Nonmetallic mineral products	\$m	4 418	4 481	4 644	5 237	4 270
Metal products	\$m	11 345	11 610	11 694	11 980	11 402
Machinery and equipment	\$m	11 685	12 053	12 551	12 924	14 366
Other manufacturing	\$m	2 496	2 590	2 722	2 730	2 660
Total	\$m	65 633	66 976	69 161	71 891	73 892
Electricity, gas and water supply	\$m	14 408	14 356	14 866	15 080	15 507
Taxes less subsidies on products	\$m	42 592	43 648	46 927	49 391	51 367
Statistical discrepancy	\$m	1	- 1	0	0	- 1
Gross domestic product	\$m	529 356	548 814	573 244	603 448	629 212

^a Chain volume measures, reference year is 1999-00.

Source: ABS, *National Income, Expenditure and Product*, cat. no. 5206.0, Canberra.

9 Volume of Australian production indexes ^a

	1996-97	1997-98	1998-99	1999-00	2000-01 ^p	2001-02 ^f
Farm						
Grains and oilseeds	115.0	100.0	116.6	125.8	124.0	116.4
Total crops	100.1	100.0	108.2	113.9	113.0	110.6
Livestock slaughterings	94.9	100.0	102.8	104.7	108.5	108.0
Total livestock	96.5	100.0	103.3	105.2	107.2	108.1
Total farm sector	98.7	100.0	106.0	109.9	110.4	109.7
Forestry ^a						
Broadleaved	96.4	100.0	97.2	118.4	119.5	116.4
Coniferous	97.2	100.0	99.0	113.1	104.9	102.2
Total forestry	96.8	100.0	98.1	115.3	111.8	108.9
Mine ^b						
Energy minerals	92.4	100.0	93.2	109.4	114.9	115.4
Metals and other minerals	94.6	100.0	99.4	103.5	112.6	114.8
Total minerals	93.4	100.0	95.8	106.8	113.9	115.1

^a Volume of roundwood equivalent removed from forests. ^b Uranium is included with energy. ^p Preliminary. ^f ABARE forecast.

Note: ABARE revised the method for calculating production indexes in October 1999. The indexes for the different groups of commodities are now calculated on a chained weight basis using Fishers' ideal index with a reference year of 1997-98 = 100.

Sources: Australian Bureau of Statistics; ABARE.

10 Employment ^a

	1995-96 '000	1996-97 '000	1997-98 '000	1998-99 '000	1999-00 '000	2000-01 ^p '000
Agriculture, forestry and fishing						
Agriculture	370	375	378	366	383	369
Forestry and logging	11	11	14	14	9	13
Commercial fishing	19	13	14	14	16	19
Total (including services)	418	422	431	422	438	429
Mining						
Coal	24	21	24	17	20	18
Oil and gas extraction	4	3	4	6	4	6
Metal ore	33	36	31	31	29	30
Other mining (including services)	25	26	24	25	25	24
Total	85	86	83	80	78	78
Manufacturing						
Food, beverages and tobacco	187	176	184	176	179	183
Textiles, clothing, footwear and leather	100	105	94	93	86	86
Wood and paper product	68	64	64	65	69	73
Printing, publishing and recorded media	110	120	122	111	115	120
Petroleum, coal and chemical product	100	107	99	104	111	110
Nonmetallic mineral product	50	48	46	48	50	44
Metal product	181	183	181	173	182	182
Other manufacturing	317	325	333	313	322	330
Total	1 112	1 129	1 121	1 083	1 115	1 131
Other industries	6 674	6 717	6 827	7 062	7 276	7 452
Total	8 289	8 355	8 461	8 647	8 907	9 090

^a Average employment over four quarters. ^p Preliminary.

Source: ABS, *The Labour Force, Australia*, cat. no. 6291.0, Canberra.

11 Business income

	1995-96	1996-97	1997-98	1998-99	1999-00
	\$m	\$m	\$m	\$m	\$m
Farm					
Net value of farm production	4 453	4 451	4 437	4 176	4 667
Company profits in selected industries a					
Mining	5 950	5 862	5 205	4 875	10 084
Manufacturing					
Food, beverages and tobacco	2 291	2 285	2 971	3 025	2 716
Textiles, clothing and footwear	269	202	222	163	242
Wood and paper products	731	626	687	864	988
Printing, publishing and recorded media	1 127	1 098	1 203	1 397	1 628
Petroleum, coal and chemical product	2 113	1 926	2 229	2 246	2 254
Nonmetallic mineral product	754	603	730	853	1 158
Metal product	1 656	1 502	1 802	450	1 043
Machinery and equipment	1 775	1 843	1 536	1 420	1 373
Other manufacturing	55	41	77	88	174
Total	10 771	10 126	11 457	10 506	11 576
Other industries (including services)	8 115	7 067	7 261	12 044	13 155
Total (including services)	24 836	23 055	23 923	27 425	34 815

a Company profits before income tax.

Sources: ABS, *Company Profits, Australia*, cat. no. 5651.0, Canberra; ABARE.

12 All banks lending to business a

	1998-99		1999-00		2000-01				
	June \$b	Sep. \$b	Dec. \$b	Mar. \$b	June \$b	Sep. \$b	Dec. \$b	Mar. \$b	June \$b
Agriculture, fishing and forestry	19.3	20.1	20.3	20.4	22.3	22.8	22.6	23.5	24.2
Mining	5.9	6.4	6.3	6.7	7.2	7.2	7.4	7.3	7.2
Manufacturing	27.5	28.6	28.8	27.8	28.8	26.4	26.7	27.6	27.5
Construction	11.1	10.9	12.1	12.4	12.5	13.6	13.4	13.9	13.1
Wholesale, retail trade, transport and storage	29.9	31.0	31.5	31.1	32.9	32.8	33.5	33.4	33.8
Finance and insurance	39.1	32.0	34.9	35.9	37.9	37.1	36.0	35.3	40.2
Other	91.3	96.9	103.0	102.6	104.9	111.5	117.0	122.3	118.7
Total	224.1	225.7	236.9	237.0	246.5	251.3	256.5	263.3	264.7

a Includes variable and fixed interest rate loans outstanding plus bank bills outstanding.

Source: Reserve Bank of Australia.

13 Farm indebtedness to financial institutions ^{ab}

	1995	1996	1997	1998	1999	2000
	\$m	\$m	\$m	\$m	\$m	\$m
All banks ^c	13 065	14 753	15 720	16 680	17 931	20 739
Other government agencies ^d	1 872	746	696	603	597	670
Finance companies						
Pastoral	398	376	486	625	476	630
Other	970	1 343	1 579	1 354	617	1 897
Other farm debt ^e	1 690	1 792	1 760	1 810	1 852	1 901
Total farm debt	17 995	19 010	20 241	21 072	21 473	25 837

^a This table, which is largely based on data from the Reserve Bank of Australia, has been modified because of changes to data collection by the bank. The farm sector is defined as enterprises covered by ANZSIC (1993) agricultural categories 011 to 021. ^b Credit outstanding in June of year indicated. ^c Derived from all banks lending to agriculture, fishing and forestry (table 13) less the fishing and forestry component, which is estimated to be around 6 per cent of that total in 1997. ^d Includes the government agency business of state banks and advances made under War Service Land Settlement. Prior to 1996 includes loans from the Queensland Industry Development Corporation. From 1996 these loans are included in bank lending. ^e Includes loans from life insurance companies, lease agreements and indebtedness to hire purchase companies, trade creditors, private lenders and small financial institutions. ^s ABARE estimate.

Sources: Reserve Bank of Australia; ABARE.

14 Capital expenditure of private enterprises

	1996-97 \$m	1997-98 \$m	1998-99 \$m	1999-00 \$m	2000-01 \$m
<i>At current prices</i>					
Gross fixed capital formation a					
All sectors	97 544	111 591	117 535	127 435	na
New capital expenditure					
Mining b	8 781	11 029	8 725	5 287	5 248
Manufacturing					
Food, beverages and tobacco	1 997	2 442	2 089	2 221	2 035
Textiles, clothing, footwear and leather	251	289	263	196	233
Wood and paper products	921	907	786	987	581
Printing, publishing and recorded media	588	796	802	782	677
Petroleum, coal and chemical product	1 664	1 596	1 513	1 801	1 379
Nonmetallic mineral products	1 070	870	500	469	512
Metal products	1 502	1 666	1 941	1 482	1 099
Machinery and equipment	2 007	2 130	1 334	1 524	1 701
Other manufacturing	199	301	208	221	180
Total	10 198	10 996	9 436	9 685	8 397
Total surveyed industries	43 837	46 210	44 681	42 447	39 358
<i>Chain volume measures c</i>					
Gross fixed capital formation a					
All sectors	98 977	112 814	117 534	127 118	na
New capital expenditure					
Mining	9 478	11 610	8 833	5 289	5 073
Manufacturing	9 894	10 776	9 124	9 685	8 204
Other selected industries	22 455	22 508	25 205	27 475	26 432
Total surveyed industries	41 539	44 328	42 962	42 448	39 709

a Estimates taken from ABS national accounts, which include taxation based statistics. b Includes industries covered by Division B (for example, the metallic and nonmetallic minerals, coal, oil and gas, construction materials and other nonmetallic minerals industries) as defined in the 1993 edition of the Australian New Zealand Standard Industrial Classification (ANZSIC). c Chain volume measures. Reference year is 1998-99.

Sources: Australian Bureau of Statistics; ABARE.

15 Private mineral exploration expenditure

	1995-96 \$m	1996-97 \$m	1997-98 \$m	1998-99 \$m	1999-00 \$m	2000-01 \$m
<i>At current prices</i>						
Energy						
Petroleum						
Onshore	174.8	251.9	232.3	182.4	110.1	176.9
Offshore	550.3	601.0	749.0	685.4	613.2	866.9
Total	725.1	852.9	981.3	867.8	723.3	1043.8
Coal	52.7	70.5	64.8	39.9	35.3	41.2
Uranium	7.2	13.0	22.2	15.5	11.6	8.4
Total	785.0	936.4	1 068.3	923.2	770.2	1 093.4
Metals and other minerals a						
Gold	547.1	728.3	648.4	486.2	374.8	384.9
Iron ore	14.1	25.8	30.0	41.6	29.7	23.4
Base metals, silver and cobalt b	251.8	206.8	227.1	176.9	156.8	186.3
Mineral sands	9.3	13.9	14.1	19.0	21.5	25.8
Diamonds	52.9	59.3	42.8	41.0	29.8	31.8
Other	25.2	30.8	17.6	17.7	16.9	19.6
Total metals and other minerals a	900.4	1064.9	980.0	782.4	629.5	671.8
Total expenditure	1 685.4	2 001.3	2 048.3	1 705.9	1 399.4	1 765.4

a Uranium is included with energy. b Base metals include copper, lead, nickel and zinc.

Sources: Australian Bureau of Statistics; ABARE.

16

World macroeconomic indicators

	Unit	1995	1996	1997	1998	1999	2000
Gross domestic product at constant prices							
OECD	%	2.5	3.2	3.4	2.4	3.0	3.5
United States	%	2.7	3.6	4.4	4.4	4.1	4.1
Japan	%	1.6	3.5	1.8	-1.1	0.8	1.5
Western Europe	%	2.2	1.4	2.1	2.5	2.2	3.3
Australia	%	4.4	4.0	3.8	5.3	4.7	3.7
Industrial production							
OECD	%	3.4	2.5	4.8	1.8	3.0	4.9
United States	%	4.8	4.6	6.8	4.9	4.2	5.7
Japan	%	3.4	2.9	4.3	-7.1	0.3	4.0
Western Europe	%	2.3	0.1	2.8	2.9	1.1	3.7
Australia	%	0.2	4.3	2.8	1.1	2.0	3.5
Consumer price index							
OECD	%	2.6	2.5	2.2	1.7	1.5	2.6
United States	%	2.8	2.9	2.3	1.6	2.2	3.4
Japan	%	-0.1	0.1	1.7	0.6	-0.3	-0.7
Western Europe	%	3.1	2.5	2.1	1.8	2.6	2.3
Australia	%	4.6	2.6	0.3	0.9	1.5	4.5
Interest rate – period average							
United States a	% pa	8.8	8.3	8.5	8.4	8.0	9.2
Japan b	% pa	2.9	2.1	1.8	1.6	1.7	1.4
Germany c	% pa	10.9	10.0	9.1	9.0	8.8	9.6
Australia d	% pa	10.8	10.5	8.9	8.2	8.0	9.2
Nominal exchange rates – period average							
Yen/US\$		94	109	121	130	114	108
Deutschmark/US\$		1.43	1.50	1.73	1.76	0.94 e	1.08 e

a Base rate charged by most major US banks. **b** Prime lending rates to large businesses. Regulated interest rates on short term bank loans over one million yen before 1997. **c** Rate on loans under one million deutschmarks. **d** Prime lending rates to large businesses. **e** Euro/US\$. **na** Not available.

Sources: Australian Bureau of Statistics; International Monetary Fund; Organisation for Economic Co-operation and Development; Reserve Bank of Australia.

17 Australian macroeconomic indicators

	Unit	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01 p
Economic activity							
Gross domestic product	%	4.2	3.7	4.5	5.3	4.3	1.8
Gross agricultural value added	%	23.5	8.2	- 0.9	4.8	6.9	- 4.2
Gross nonagricultural value added	%	4.0	3.5	4.6	5.3	4.2	2.1
Household final consumption expenditure	%	3.8	2.9	4.8	5.1	4.1	- 6.9
Private gross fixed capital formation	%	3.2	10.5	13.6	3.1	9.0	- 10.1
Labor							
Total employment	%	2.6	1.0	1.4	2.2	2.7	2.1
Unemployment rate ^a		8.4	8.6	8.3	7.4	6.6	6.4
Prices							
Consumer price index	%	4.2	1.3	0.0	1.2	2.4	6.0
Interest rate – period average							
90-day bank accepted commercial bill	% pa	7.5	6.3	5.0	4.9	5.6	6.0
Prime business lending rate	% pa	10.8	9.7	8.4	8.0	8.4	9.2
10-year Commonwealth Treasury bond	% pa	8.7	7.6	6.0	5.5	6.5	5.8
Trade							
Current account balance	\$m	-21 452	-17 602	-22 807	-33 366	-33 479	-18 686
– as a percentage of GDP	%	- 4.2	- 3.3	- 4.1	- 5.6	- 5.3	- 2.8
Terms of trade ^b		98.2	101.1	101.1	95.9	100.0	103.1
Exchange rates – period average							
Trade weighted index for A\$ ^c		55	59	58	56	55	50
US\$/A\$		0.755	0.780	0.679	0.626	0.630	0.539
Yen/A\$		77.1	90.0	85.6	77.1	67.8	61.5
Deutschmark/A\$		1.10	1.25	1.22	1.10	1.23	1.18
£sterling/A\$		0.49	0.48	0.42	0.38	0.39	0.37
NZ\$/A\$		1.13	1.12	1.14	1.18	1.25	1.23

^a Unemployed as a percentage of civilian labour force. ^b Ratio of implicit price deflator for exports of goods and services to implicit price deflator for imports of goods and services. Base: 1999-2000 = 100. ^c Base: May 1970 = 100. ^p Preliminary.
 Sources: Australian Bureau of Statistics; Reserve Bank of Australia; ABARE.

18 Annual world indicator prices of selected commodities

	Unit	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
Crops							
Wheat a	US\$/t	179	142	119	113	129	132
Corn b	US\$/t	132	112	95	90	87	92
Rice c	US\$/t	338	302	284	231	184	178
Soybeans d	US\$/t	297	258	210	210	201	190
Cotton e	USc/lb	78.6	73.2	60.2	52.5	58.4	44.6
Sugar g	USc/lb	11.7	10.8	7.2	7.2	10.0	8.2
Livestock products							
Beef h	USc/kg	184	183	175	199	196	207
Wool i	Ac/kg	670	733	550	627	764	740
Butter j	US\$/t	1 418	1 668	1 546	1 196	1 293	1 275
Cheese j	US\$/t	2 175	1 968	1 804	1 746	2 070	2 235
Skim milk powder j	US\$/t	1 828	1 584	1 303	1 463	2 167	2 100
Energy							
Crude oil							
Dubai	US\$/bbl	20.03	15.15	12.42	23.24	25.76	18.63
West Texas intermediate	US\$/bbl	22.47	17.61	14.34	26.18	29.45	20.98
Brent	US\$/bbl	20.54	16.52	12.96	24.35	27.78	19.87
World trade weighted average k	US\$/bbl	20.30	15.03	12.31	24.05	26.82	18.81
Thermal coal							
Japan (landed)	US\$/t	47.64	44.85	41.17	37.31	37.82	39.19
EU (landed)	US\$/t	45.65	42.70	39.65	34.49	36.83	36.45
Metallurgical coal							
Japan (landed)	US\$/t	57.67	56.96	52.29	45.48	43.92	44.39
EU (landed)	US\$/t	61.47	60.78	56.06	50.78	50.97	49.40
Uranium (U ₃ O ₈) l	US\$/lb	14.24	11.18	10.10	9.40	7.83	9.47
Minerals and metals m							
Aluminium	US\$/t	1 513	1 510	1 276	1 515	1 536	1 304
Copper	US\$/t	2 265	1 903	1 515	1 738	1 787	1 435
Gold	US\$/oz	364	306	286	282	269	277
Iron ore (negotiated) n	USc/dltu	28.78	29.10	29.92	26.63	27.79	28.98
Lead	US\$/t	707	568	513	465	476	476
Manganese (negotiated) o	US\$/mtu	2.19	2.08	2.04	1.90	2.03	2.11
Nickel	US\$/t	7 224	5 814	4 507	8 262	7 240	5 245
Silver q	USc/oz	491	544	516	520	467	444
Tin	US\$/t	5 899	5 550	5 420	5 510	5 406	4 414
Zinc	US\$/t	1 124	1 227	998	1 144	1 050	797

a US hard red winter wheat, fob Gulf. b US no. 2 yellow corn, delivered US Gulf. c Prices previously reported by the Thailand Board of Trade are no longer available. From September 1998 the price quoted is the USDA sourced nominal quote for Thai white rice, 100 per cent, Grade B, fob, Bangkok (August–July basis). d US cif Rotterdam (October–September basis). e Cotlook 'A' index. g Average of monthly averages of New York no.11 spot price; basis: fob Caribbean ports (September–August basis). h US cif price. i Australian Wool Exchange eastern market indicator. j Average of traded prices (excluding subsidised sales). k World trade weighted average price compiled by the US Department of Energy. Official sales prices or estimated contract terms for major internationally traded crude oils. l Average of weekly restricted spot prices over the period, published by Ux Consulting. m Average LME spot price unless otherwise stated. n Australian hematite fines to Japan (fob) for Japanese fiscal year commencing 1 April. o Japanese fiscal year commencing 1 April. q Handy and Harman, commercial bar. p Preliminary. f ABARE forecast.

Sources: Australian Bureau of Statistics; Australian Dairy Corporation; Meat and Livestock Australia; Australian Wool Exchange; F.O. Licht; Food and Agriculture Organisation; General Agreement on Tariffs and Trade; International Energy Agency; International Sugar Organisation; International Wheat Council; ISTA Mielke and Co.; Ux Consulting Company; Platts Oilgram; US Department of Agriculture; US Department of Energy; World Bureau of Metal Statistics; ABARE.

19 Quarterly world indicator prices of selected commodities

		1999-00	2000-01				2001-02			
	Unit	June	Sep	Dec	Mar	June	Sep	Dec s	Mar f	June f
Crops										
Wheat a	US\$/t	116	118	131	134	133	127	130	133	137
Corn b	US\$/t	92	77	89	94	86	91	89	93	95
Rice c	US\$/t	215	192	191	187	173	176	176	178	181
Soybeans d	US\$/t	223	201	209	202	187	207	188	190	193
Cotton e	USc/lb	59.6	60.3	64.2	59.7	49.5	43.4	38.3	45.1	51.6
Sugar g	USc/lb	7.5	10.6	10.4	10.2	9.6	10.2	10.4	8.9	8.7
Livestock products										
Beef h	USc/kg	199	193	192	200	203	228	210	200	190
Wool i	Ac/kg	721	709	728	807	814	784	749	710	707
Butter j	US\$/t	1 158	1 267	1 329	1 283	1 292	1 275	1 266	1 280	1 280
Cheese j	US\$/t	1 813	1 892	1 975	2 142	2 270	2 235	2 266	2 266	2 172
Skim milk powder j	US\$/t	1 658	2 125	2 225	2 192	2 125	2 100	2 072	2 114	2 114
Energy										
Crude oil										
Dubai	US\$/bbl	24.17	25.72	28.56	23.63	25.15	24.16	17.79	16.74	15.82
West Texas intermediate	US\$/bbl	27.33	28.97	32.28	28.60	27.93	26.78	20.27	19.11	17.75
Brent	US\$/bbl	25.29	26.95	30.77	26.14	27.28	25.40	19.06	18.06	16.94
World trade weighted average k	US\$/bbl	26.31	28.79	28.58	24.33	25.57	24.24	18.00	17.00	16.00
Thermal coal s										
Japan (landed)	US\$/t	36.39	36.74	37.78	36.03	40.73	39.20	39.16	39.13	39.27
EU (landed)	US\$/t	36.16	35.84	37.47	34.73	39.29	36.40	36.40	36.41	36.59
Metallurgical coal s										
Japan (landed)	US\$/t	43.71	42.99	44.15	42.52	46.02	44.50	44.32	44.30	44.46
EU (landed)	US\$/t	51.08	50.21	51.92	49.35	52.39	49.55	49.34	49.28	49.42
Uranium (U ₃ O ₈) l	US\$/lb	8.53	7.80	7.13	7.68	8.72	9.10	9.43	9.60	9.75
Minerals and metals m										
Aluminium	US\$/t	1 478	1 564	1 514	1 564	1 501	1 380	1 276	1 260	1 300
Copper	US\$/t	1 747	1 872	1 848	1 763	1 663	1 471	1 437	1 400	1 433
Gold	US\$/oz	280	277	269	264	268	274	278	282	272
Lead	US\$/t	417	470	472	493	469	469	474	480	480
Nickel	US\$/t	9 411	8 265	7 455	6 556	6 684	5 496	4 985	5 100	5 400
Silver n	USc/oz	507	496	475	456	439	421	418	450	480
Tin	US\$/t	5 431	5 376	5 262	5 113	4 910	4 335	3 750	4 400	4 600
Zinc	US\$/t	1 134	1 177	1 072	1 020	930	826	780	790	793

a US hard red winter wheat, fob Gulf. b US no. 2 yellow corn, delivered US Gulf. c Prices previously reported by the Thailand Board of Trade are no longer available. From September 1998 the price quoted is the USDA sourced nominal quote for Thai white rice, 100 per cent, Grade B, fob, Bangkok. d US cif Rotterdam. e Cotlook 'A' index. g Average of monthly averages of New York no.11 spot price; basis: fob Caribbean ports. h US cif price. i Australian Wool Exchange eastern market indicator. j Average of traded prices (excluding subsidised sales). k World trade weighted average price compiled by the US Department of Energy. l Average of weekly restricted spot prices over the period, published by Ux Consulting. m Average LME spot price unless otherwise stated. n Hardy and Harman, commercial bar. p Preliminary. f ABARE forecast. s ABARE estimate.

Sources: Australian Bureau of Statistics; Australian Dairy Corporation; Meat and Livestock Australia; Australian Wool Exchange; F.O. Licht; Food and Agriculture Organisation; General Agreement on Tariffs and Trade; International Energy Agency; International Sugar Organisation; International Wheat Council; ISTA Mielke and Co.; Ux Consulting Co.; Platts Oilgram; US Department of Agriculture; US Department of Energy; World Bureau of Metal Statistics; ABARE.

20 Australian gross unit values or prices of farm products ^a

	Unit	1996-97	1997-98	1998-99	1999-00	2000-01 ^p	2001-02 ^f
Crops ^b							
Grains and oilseeds							
Wheat	\$/t	206	193	183	187	218	233
Barley	\$/t	195	159	140	172	196	202
Oats	\$/t	137	137	87	106	142	140
Triticale	\$/t	158	170	120	126	155	152
Maize	\$/t	200	204	179	153	163	162
Sorghum	\$/t	180	169	149	123	155	150
Rice	\$/t	195	256	213	233	190	195
Lupins	\$/t	206	196	156	145	176	186
Field peas	\$/t	245	272	294	297	304	329
Canola	\$/t	340	388	344	288	318	410
Sunflowerseed ^c	\$/t	329	347	260	334	331	332
Soybeans ^c	\$/t	420	415	331	370	344	446
Industrial crops							
Cotton lint ^d	c/kg	235	252	228	199	256	209
Sugar cane (cut for crushing)	\$/t	30	30	26	24	22	29
Wine grapes	\$/t	666	805	884	800	811	820
Livestock for slaughter							
Beef ^e	c/kg	152	172	195	217	266	310
– yearling ^e	c/kg	179	199	225	244	289	317
– ox ^e	c/kg	166	198	211	227	273	319
– cow ^e	c/kg	128	146	174	198	249	297
Lamb ^{eg}	c/kg	224	184	197	187	202	230
Mutton ^e	c/kg	69	81	71	61	101	118
Pig ^e	c/kg	237	194	190	240	258	282
Poultry ^h	c/kg	354	357	349	359	354	367
Livestock products							
Wool ⁱ	c/kg	670	733	550	627	764	740
Milk ^j	c/L	29.6	29.4	28.5	26.3	28.2	30.2

^a Average gross unit value across all grades in principal markets, unless otherwise indicated. Includes the cost of containers, commission and other expenses incurred in getting the commodities to their principal markets. These expenses are significant. ^b Average unit gross value relates to returns received from crops harvested in that year, regardless of when sales take place, unless otherwise indicated. ^c Price paid by crusher. ^d Australian base price for sales in the financial year indicated. ^e Average saleyard price (dressed weight). ^g New lamb saleyard indicator weight introduced in July 1995. New weight indicator 18–20 kg dressed weight used from 1995-96. Prior to 1995-96, 16–18 kilograms dressed weight used. ^h Retail, frozen. ⁱ Australian Wool Exchange eastern market indicator. ^j Weighted average farmgate price. ^p Preliminary. ^f ABARE forecast.

Note: Prices used in these calculation exclude GST.

Sources: Australian Bureau of Statistics; ABARE.

21 World production, consumption, stocks and trade for selected commodities ^a

	Unit	1996-97	1997-98	1998-99	1999-00	2000-01 ^p	2001-02 ^f
Farm							
Grains							
Production							
Wheat	Mt	582	609	589	586	582	574
Coarse grains	Mt	907	883	889	876	857	872
Rice ^b	Mt	380	387	394	408	396	393
Consumption							
Wheat	Mt	581	587	588	590	595	600
Coarse grains	Mt	875	874	870	882	879	895
Rice ^b	Mt	379	380	387	399	401	405
Closing stocks							
Wheat	Mt	142	167	165	159	146	120
Coarse grains	Mt	127	148	215	210	188	165
Rice ^b	Mt	119	126	133	143	138	126
Exports							
Wheat ^c	Mt	99	99	99	109	100	105
Coarse grains ^c	Mt	108	100	108	123	119	114
Rice ^{cd}	Mt	28	27	24	23	23	24
Oilseeds and vegetable oils							
Production							
Oilseeds	Mt	261	287	295	303	311	323
Vegetable oils	Mt	74	76	81	86	89	91
Vegetable protein meals	Mt	146	158	165	169	177	183
Consumption							
Oilseeds	Mt	263	282	293	301	312	322
Vegetable oils	Mt	73	74	79	83	88	90
Vegetable protein meals	Mt	148	155	164	169	176	182
Closing stocks							
Oilseeds	Mt	13	16	19	22	20	21
Vegetable oils	Mt	6	6	7	8	8	7
Vegetable protein meals	Mt	5	5	6	5	5	5
Exports							
Oilseeds	Mt	50	55	55	65	71	70
Vegetable oils	Mt	29	31	32	34	35	36
Vegetable protein meals	Mt	50	56	54	56	57	58
Industrial crops							
Production							
Cotton	Mt	20	20	19	19	19	21
Sugar	Mt	124	126	135	134	130	133
Consumption							
Cotton	Mt	19	19	19	20	20	20
Sugar	Mt	122	123	125	128	130	131
Closing stocks							
Cotton	Mt	9	10	10	9	8	10
Sugar	Mt	47	50	57	61	60	60
Exports							
Cotton	Mt	6	6	5	6	6	6
Sugar	Mt	39	37	42	42	41	38

Continued

21 World production, consumption, stocks and trade for selected commodities ^a (continued)

	Unit	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
Livestock products							
Production							
Meat deg	Mt	182	188	194	196	200	204
Wool h	kt	1 492	1 443	1 400	1 380	1 390	1 363
Butter dg	kt	5 073	5 216	5 361	5 561	5 662	5 501
Skim milk powder dgi	kt	3 178	3 130	3 225	3 234	2 906	3 024
Consumption							
Meat deg	Mt	178	184	191	193	197	201
Wool dhj	kt	1 379	1 287	1 487	1 480	1 500	1 490
Butter dg	kt	4 863	4 910	4 988	5 175	5 402	5 061
Skim milk powder dgi	kt	2 943	2 924	2 976	3 036	2 916	2 568
Closing stocks							
Meat deg	Mt	3.6	3.7	3.9	4.1	4.2	3.8
Wool hk	kt	304	262	258	176	88	62
Butter dg	kt	418	493	544	542	460	488
Skim milk powder dgi	kt	560	608	604	617	777	757
Exports							
Meat cdeg	Mt	14.6	14.6	16.0	16.1	16.4	17.3
Wool hl	kt	876	880	750	872	914	904
Butter dg	kt	745	625	591	638	630	622
Skim milk powder gi	kt	1 043	938	1 051	996	981	966
Energy d							
Crude oil							
Production							
World m	mbd	74.3	75.5	74.1	76.7	76.9	77.8
OPEC n	mbd	29.9	30.8	29.4	30.8	30.4	30.4
Consumption m	mbd	72.7	73.5	75.3	75.9	76.0	76.6
Closing stocks							
OECD o	days	57.0	58.0	54.0	52.0	55.0	54.0
Coal d							
Production							
Hard coal q	Mt	3 821	3 758	3 666	3 639	3 719	3 849
Brown coal	Mt	926	908	882	910	914	918
Exports							
Metallurgical coal	Mt	196	192	180	193	197	203
Thermal coal	Mt	336	354	368	402	390	415
Uranium (U₃O₈) 1							
Production rs	kt	42.8	40.0	36.6	37.2	37.3	37.5
Consumption	kt	75.2	75.0	76.4	77.5	78.5	79.5
Metals d							
Bauxite production	kt	126 136	122 867	129 164	137 089	141 991	142 620
Alumina production	kt	46 709	48 245	50 050	52 880	52 537	53 482
Aluminium							
Production	kt	21 800	22 648	23 705	24 623	24 692	25 137
Consumption	kt	21 854	21 842	23 579	25 014	24 564	24 981
Closing stocks t	kt	2 258	2 324	2 574	2 109	2 358	2 513
Exports	kt	13 608	13 686	14 611	14 600	14 700	15 000

Continued

21 World production, consumption, stocks and trade for selected commodities ^a (continued)

	Unit	1996-97	1997-98	1998-99	1999-00	2000-01 ^p	2001-02 ^f
Iron and steel ^d							
Production							
Iron ore	Mt	1 055	986	960	1 046	1 043	1 052
Pig iron	Mt	515	503	511	544	546	550
Crude steel	Mt	799	777	786	845	838	841
Exports							
Iron ore	Mt	470	454	444	483	499	509
Gold ^d							
Mine production	t	2 481	2 541	2 570	2 573	2 550	2 515
Supply	t	4 231	4 106	4 112	3 937	3 770	3 815
Fabrication consumption ^u	t	3 907	3 719	3 744	3 739	3 610	3 522
Base metals ^d							
Production ^v							
Copper	kt	13 599	14 145	14 471	14 836	15 360	15 465
Lead	kt	6 032	6 016	6 274	6 575	6 446	6 548
Nickel	kt	1 012	1 034	1 021	1 080	1 095	1 115
Tin	kt	242	241	245	260	255	255
Zinc	kt	7 516	7 918	8 131	8 913	9 276	9 701
Consumption							
Copper	kt	13 029	13 362	14 090	15 163	14 696	14 555
Lead	kt	6 041	6 046	6 251	6 497	6 444	6 512
Nickel	kt	1 016	1 010	1 083	1 128	1 050	1 105
Tin	kt	241	241	243	257	250	255
Zinc	kt	7 752	7 865	8 089	8 804	8 740	8 898
Closing stocks ^w							
Copper	kt	1 021	1 345	1 472	1 061	1 600	1 600
Lead	kt	440	418	472	421	441	455
Nickel	kt	156	157	124	89	151	171
Tin	kt	34	31	32	35	37	37
Zinc	kt	901	762	723	647	911	950
Exports							
Copper	kt	5 644	5 550	5 650	5 750	5 750	5 800
Lead	kt	1 328	1 361	1 437	1 394	1 500	1 500
Tin	kt	220	241	230	232	220	225
Zinc	kt	2 826	2 724	2 850	2 850	2 850	2 900
Mineral sands ^d							
Production							
Ilmenite ^x	kt	8 772	9 442	9 007	9 400	9 450	9 500
Titaniferous slag	kt	2 130	2 285	2 200	2 170	2 200	2 250
Rutile concentrate	kt	435	443	397	418	435	450
Zircon concentrate	kt	943	943	988	989	1 050	1 075

^a Some figures are not based on precise or complete analyses. ^b Milled equivalent. ^c Includes intra-EU trade. ^d On a calendar year basis, e.g. 1991-92 = 1992. ^e Beef and veal, mutton, lamb, goat, pig and poultry meat. ^g Selected countries. ^h Clean equivalent. ⁱ Nonfat dry milk. ^j Virgin wool at the spinning stage in 65 countries. ^k Held by marketing bodies and on-farm in five major exporting countries. ^l Five major exporting countries. ^m Includes crude oil, marine bunkers, refinery fuel, nonconventional oil and natural gas liquids. ⁿ 1 million litres a year equals about 17.2 barrels a day. ^o Includes OPEC natural gas liquids. ^p Preliminary. ^q Industry stocks in OECD countries at the start of the quarter. ^r Includes anthracite and bituminous coal, and for the United States, Australia and New Zealand, sub-bituminous coal. ^s World production data has been revised to exclude reprocessed uranium. ^t LME and producer stocks. ^u Includes jewellery consumption. ^v Primary refined metal. ^w Commercial stocks excluding former and current centrally planned economies. ^x Excludes some small producers and large tonnages produced from ilmenite-magnetite ore in the Commonwealth of Independent States. ^y Preliminary. ^z ABARE forecast. ^{aa} ABARE estimate. ^{ab} Not available.

Sources: Australian Bureau of Statistics; Meat and Livestock Australia; Commodities Research Unit; Commonwealth Secretariat; Consolidated Gold Fields; Department of Agriculture, Fisheries and Forestry Australia; Economic Commission for Europe; Fearnleys; F.O. Licht; Food and Agriculture Organisation; Gold Fields Mineral Services; International Atomic Energy Agency; International Energy Agency; International Iron and Steel Institute; International Lead-Zinc Study Group; International Wheat Council; ISTA Mielke and Co.; Metallgesellschaft A.G.; Ministry of Agriculture, Forestry and Fisheries (Japan); New Zealand Dairy Board; New Zealand Wool Board; UNCTAD Trust Fund on Iron Ore; United Nations; Uruguayan Association of Wool Exporters; US Department of Agriculture; World Bureau of Metal Statistics; ABARE.

22 Australian commodity production

	Unit	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
Crops							
Grains and oilseeds							
Wheat	kt	23 702	19 224	21 464	24 758	23 765	22 070
Barley	kt	6 696	6 482	5 987	5 032	7 196	6 784
Oats	kt	1 653	1 634	1 798	1 118	1 131	1 233
Triticale	kt	674	633	708	764	601	526
Maize	kt	398	271	338	406	355	461
Sorghum	kt	1 425	1 081	1 891	2 116	2 107	2 195
Rice	kt	1 388	1 331	1 390	1 101	1 760	1 397
Lupins	kt	1 523	1 561	1 696	1 968	800	1 085
Field peas	kt	454	316	298	357	401	345
Chickpeas	kt	288	199	188	230	146	230
Sunflowerseed	kt	143	98	209	147	70	99
Soybeans	kt	74	54	109	105	62	58
Cottonseed s	kt	860	941	1 012	1 047	1 062	874
Canola	kt	624	856	1 690	2 426	1 905	1 545
Other oilseeds a	kt	66	53	72	85	78	73
Total	kt	40 007	34 773	38 888	41 703	41 472	39 012
Industrial crops							
Cotton lint	kt	608	666	716	741	751	618
Sugar cane (cut for crushing)	kt	39 938	41 064	40 128	39 699	31 228	33 716
Sugar (tonnes actual)	kt	5 301	5 567	4 998	5 448	4 162	4 662
Tobacco (green weight)	kt	9	9	9	9	9	9
Wine grapes	kt	798	951	1 101	1 129	1 452	1 507
Livestock slaughtering							
Number slaughtered							
Cattle and calves	'000	8 442	9 321	9 097	8 649	8 695	8 527
Cattle exported live b	'000	864	692	713	846	846	855
Sheep	'000	14 340	16 299	14 393	15 585	16 524	15 532
Lambs	'000	14 579	14 954	16 053	17 557	18 502	17 568
Sheep exported live b	'000	5 237	4 961	4 959	4 859	5 936	6 233
Pigs	'000	4 796	5 091	5 176	5 025	5 013	5 197
Meat produced							
Beef and veal c	kt	1 810	1 955	2 011	1 988	2 054	2 034
Mutton c	kt	296	333	302	328	345	321
Lamb c	kt	270	283	312	347	365	343
Pig meat	kt	336	358	370	363	365	384
Poultry meat c	kt	533	588	604	638	657	667
Total	kt	3 245	3 517	3 598	3 664	3 787	3 749

Continued

22 Australian commodity production (continued)

	Unit	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
Livestock products							
Wool d	kt	725	700	687	666	652	644
Milk e	ML	9 036	9 439	10 178	10 847	10 556	11 243
Butter g	kt	147	154	176	172	158	145
Cheese	kt	290	310	320	369	356	371
Casein	kt	5	9	8	7	8	8
Skim milk powder h	kt	223	215	255	247	247	258
Wholemilk powder	kt	134	128	145	187	211	230
Buttermilk powder	kt	15	15	17	18	15	16
Forestry							
Volume of roundwood equivalent removed from forests	'000 m ³	20 003	20 808	20 480	24 009	23 100	22 500
Fisheries i							
Tuna j	kt	13.0	11.9	16.7	16.2	18.1	20.4
Other fish k	kt	128.5	134.3	127.2	117.2	121.0	124.0
Prawns	kt	27.7	29.6	31.2	26.3	30.9	29.6
Rock lobster	kt	15.8	16.6	19.2	20.3	16.4	15.0
Abalone	kt	5.2	5.2	5.6	5.5	5.7	5.5
Scallops	kt	6.3	5.8	11.5	11.6	9.3	9.9
Oysters	kt	10.1	10.5	10.7	13.0	12.3	10.7
Other molluscs	kt	7.4	7.6	8.0	8.0	9.1	9.2
Other crustaceans	kt	7.7	7.6	6.5	8.2	9.2	9.4
Energy							
Coal							
Black, salable	Mt	207.5	222.4	225.0	239.3	257.8	267.1
Black, raw	Mt	261.3	278.6	284.3	298.7	322.3	333.4
Brown	Mt	59.8	64.2	65.5	66.4	65.0	64.7
Petroleum							
Crude oil and condensate	ML	31 049	33 961	27 898	37 447	38 705	37 404
Petroleum products l	ML	46 872	47 400	47 030	48 100	48 160	48 274
Natural gas m	Gm ³	30.2	31.4	32.2	33.4	34.3	35.7
LPG (naturally occurring)	ML	4 253	4 901	4 368	4 832	4 558	4 682
Uranium (U ₃ O ₈)	t	5 975	5 788	6 387	8 217	9 482	9 898
Metalliferous minerals and metals n							
Aluminium							
Bauxite	Mt	43.0	44.5	46.4	51.0	54.6	54.3
Alumina	kt	13 252	13 581	14 207	15 037	16 098	16 400
Aluminium (ingot metal)	kt	1 395	1 589	1 686	1 742	1 788	1 822
Copper							
Mine production o	kt	547	576	691	788	878	895
Refined, primary	kt	310	283	306	477	518	595
Gold							
Mine production o	t	299.4	316.7	302.8	298.5	297.9	288.3
Refined, Australian origin	t	291.6	279.7	296.9	317.6	316.0	292.5
Refined, overseas origin	t	34.9	68.5	121.8	65.4	44.6	59.8

Continued

22 Australian commodity production (continued)

	Unit	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
Metalliferous minerals and metals (continued)							
Iron and steel							
Ore and concentrate q	Mt	153.3	161.1	153.5	159.7	175.8	181.0
Iron and steel	Mt	8.5	9.1	8.5	8.1	8.1	8.6
Ferroalloys	kt	205	185	207	214	220	225
Lead							
Mine production o	kt	516	571	662	692	677	690
Refined r	kt	202	185	199	233	215	235
Bullion	kt	191	171	157	165	153	156
Manganese							
Ore, metallurgical grade	kt	2 297	1 647	1 630	1 755	1 948	1 960
Metal content of ores and concentrates	kt	1 105	794	790	858	953	943
Nickel							
Mine production o	kt	115	134	127	141	194	203
Refined, class I s	kt	61	60	69	89	108	123
Refined, class II u	kt	12	19	9	12	11	7
Total ore processed v	kt	141	169	167	176	238	250
Silver							
Mine production o	t	1 010	1 333	1 593	1 889	2 021	2 030
Refined	t	339	227	410	543	532	545
Tin							
Mine production o	t	9 284	10 100	9 822	9 828	9 873	10 000
Refined	t	570	650	595	602	1 039	750
Titanium							
Ilmenite concentrate	kt	2 100	2 392	2 156	2 134	2 092	2 094
Leucoxene concentrate	kt	31	28	28	33	34	31
Rutile concentrate	kt	197	247	214	186	209	230
Synthetic rutile s	kt	534	662	569	566	650	687
Titanium dioxide pigment s	kt	159	162	164	168	181	178
Zinc							
Mine production o	kt	1 060	1 038	1 142	1 265	1 483	1 507
Refined	kt	319	304	323	405	534	550
Zircon concentrate	kt	411	409	385	372	378	429
Other minerals							
Diamonds	'000 ct	37 120	43 046	35 948	29 672	22 475	28 943
Salt	kt	8 315	9 035	9 203	9 610	9 637	8 923

a Linseed and safflowerseed. b Excludes animals exported for breeding purposes. c In carcass weight and includes carcass equivalent of canned meats. d Greasy equivalent of shorn wool (includes crutching), dead and fellmongered wool and wool exported on skins. e Includes the wholemilk equivalent of farm cream intake. g Includes the butter equivalent of butteroil, butter concentrate, ghee and dry butterfat. h Includes mixed skim and buttermilk powder. i Liveweight. j Tuna captured under joint venture or bilateral agreements or transhipped at sea is included. k Includes an estimated value of aquaculture but excludes inland commercial fisheries. l Includes production from petrochemical plants. m Includes ethane, methane and noncommercial natural gas. n Uranium is included with energy. o Primary production, metal content. q Excludes iron oxide not intended for metal extraction. r Includes lead content of lead alloys from primary sources. t Products with a nickel content of 99 per cent or more. Includes electrolytic nickel, pellets, briquettes and powder. u Products with a nickel content of less than 99 per cent. Includes ferronickel, nickel oxides and oxide sinter. v Includes imported ore for further processing. p Preliminary. f ABARE forecast. s ABARE estimate.

Sources: Australian Bureau of Statistics; Australian Dairy Corporation; Consolidated Gold Fields; Joint Coal Board; Queensland Coal Board; Raw Cotton Marketing Advisory Committee; ABARE.

23 Gross value of Australian farm and fisheries production

	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
	\$m	\$m	\$m	\$m	\$m	\$m
Crops						
Grains and oilseeds						
Wheat	4 878	3 716	3 935	4 623	5 186	5 139
Barley	1 308	1 032	836	865	1 407	1 368
Oats	227	223	157	118	161	173
Triticale	107	108	85	96	93	80
Maize	80	55	61	62	58	75
Sorghum	257	183	282	260	327	329
Rice	270	341	296	256	335	272
Lupins	314	306	265	286	140	202
Field peas	111	86	88	106	122	113
Chickpeas	111	97	87	103	80	78
Canola	212	332	582	699	606	633
Sunflowerseed	47	34	54	49	23	33
Soybeans	31	22	36	39	21	26
Other oilseeds a	46	41	43	48	49	51
Total	7 998	6 576	6 805	7 611	8 609	8 572
Industrial crops						
Cotton lint and cotton seed b	1 342	1 449	1 378	1 571	1 539	1 138
Sugar cane (cut for crushing)	1 186	1 248	1 058	943	683	965
Tobacco (green weight) s	46	40	49	49	49	49
Wine grapes	532	766	974	903	1 178	1 235
Total	3 106	3 503	3 458	3 466	3 448	3 387
Other crops						
Other crops n.e.i. c	5 065	5 373	5 752	5 667	5 975	6 273
Total crops	16 170	15 452	16 015	16 743	18 032	18 231

Continued

23 Gross value of Australian farm and fisheries production (continued)

	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
	\$m	\$m	\$m	\$m	\$m	\$m
Livestock slaughtering						
Cattle and calves d	3 169	3 805	4 134	4 616	5 900	6 682
Cattle exported live e	428	333	343	433	482	500
Sheep g	216	299	227	204	360	392
Lambs gh	637	574	645	669	760	816
Sheep exported live	190	193	182	180	258	348
Pigs	765	710	690	792	855	983
Poultry	932	1 054	1 019	1 031	1 085	1 167
Total	6 336	6 968	7 238	7 925	9 699	10 888
Livestock products						
Wool i	2 621	2 754	2 142	2 175	3 096	2 783
Milk j	2 811	2 817	2 900	2 853	2 977	3 395
Other livestock products k	321	377	384	392	462	501
Total	5 753	5 948	5 426	5 420	6 535	6 680
Total farm	28 259	28 367	28 679	30 088	34 266	35 799
Fisheries products l						
Tuna m	96	131	220	255	310	367
Other fin fish n	378	396	444	476	484	509
Prawns	344	385	441	432	517	458
Rock lobster	413	377	418	545	432	398
Abalone	153	182	170	236	269	248
Scallops	37	39	40	43	48	52
Oysters	52	47	45	52	49	46
Pearls	150	176	182	190	250	257
Other molluscs o	102	95	99	97	100	101
Other crustaceans	51	52	53	54	57	56
Total fish	1 756	1 884	2 064	2 331	2 479	2 554

a Linseed, safflowerseed and peanuts. b Value delivered to gin. c Mainly fruit, vegetables and fodder crops. d Includes dairy cattle slaughtered. e Excludes animals exported for breeding purposes. g Excludes skin values. h New lamb saleyard indicator weight introduced in July 1995. New weight indicator 18–20 kilograms dressed weight used from 1995-96; 16–18 kilograms dressed weight. i Shorn, dead and fellmongered wool and wool exported on skins. j Milk intake by factories and valued at farmgate. k Mainly egg production, honey and beeswax. l Value to fishermen of product landed in Australia. m Tuna captured under joint venture or bilateral agreements or transhipped at sea is included. n Includes an estimated value of aquaculture. o Includes Northern Territory production. p Preliminary. f ABARE forecast. s ABARE estimate.

Note: The gross value of production is the value placed on recorded production at the wholesale prices realised in the market place. The point of measurement can vary between commodities. Generally the market place is the metropolitan market in each state and territory. However, where commodities are consumed locally or where they become raw material for a secondary industry, these points are presumed to be the market place.

Note: Prices used in these calculations exclude GST.

Sources: Australian Bureau of Statistics; ABARE.

24 Crop areas and livestock numbers

	Unit	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
Crop areas							
Grains and oilseeds							
Wheat	'000 ha	11 337	10 439	11 543	12 168	13 002	11 176
Barley	'000 ha	3 367	3 521	3 167	2 596	3 675	3 299
Oats	'000 ha	1 052	937	909	584	697	679
Triticale	'000 ha	346	366	386	361	279	275
Maize	'000 ha	67	57	66	82	75	91
Sorghum	'000 ha	544	507	587	622	818	793
Rice	'000 ha	167	141	152	133	186	154
Lupins	'000 ha	1 259	1 424	1 407	1 347	1 161	1 102
Field peas	'000 ha	336	367	369	321	312	268
Chickpeas	'000 ha	241	273	309	218	233	187
Peanuts	'000 ha	22	22	22	24	22	22
Canola	'000 ha	408	698	1 247	1 917	1 562	1 151
Sunflowerseed	'000 ha	139	92	167	120	69	91
Soybeans	'000 ha	39	32	48	53	34	33
Other oilseeds a	'000 ha	43	24	44	47	47	47
Total	'000 ha	19 366	18 900	20 422	20 592	22 172	19 368
Industrial crops							
Cotton	'000 ha	396	438	562	464	504	388
Sugar cane b	'000 ha	401	420	414	419	411	417
Tobacco	'000 ha	3	3	3	3	3	3
Winegrapes b	'000 ha	72	78	95	110	123	137
Livestock numbers c							
Sheep	million	120.2	117.5	115.5	115.7	113.3	111.4
Cattle							
Beef	million	23.74	23.78	23.36	24.45	25.37	25.50
Dairy	million	2.96	3.08	3.22	3.14	3.40	3.56
milking herd d	million	1.98	2.06	2.16	2.17	2.28	2.39
Total	million	26.69	26.85	26.58	27.59	28.77	29.06
Pigs	million	2.56	2.77	2.63	2.51	2.76	2.79

a Linseed and safflowerseed. b Cut for crushing. c At 31 March until 1998-99. At 30 June from 1999-00. Details for establishments with an estimated value of agricultural operations of \$5000 or more. d Cows in milk and dry. p Preliminary. f ABARE forecast.

Sources: Australian Bureau of Statistics; ABARE.

25 Average farm yields

	Unit	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
Crops							
Grains and oilseeds							
Wheat	t/ha	2.09	1.84	1.86	2.03	1.83	1.97
Barley	t/ha	1.99	1.84	1.89	1.94	1.96	2.06
Oats	t/ha	1.57	1.74	1.98	1.91	1.62	1.82
Triticale	t/ha	1.95	1.73	1.83	2.12	2.15	1.91
Maize	t/ha	5.94	4.75	5.12	4.95	4.73	5.07
Sorghum	t/ha	2.62	2.13	3.22	3.40	2.58	2.77
Rice	t/ha	8.33	9.42	9.16	8.26	9.45	9.07
Lupins	t/ha	1.21	1.10	1.21	1.46	0.69	0.98
Field peas	t/ha	1.35	0.86	0.81	1.11	1.29	1.29
Chickpeas	t/ha	1.19	0.73	0.61	1.05	0.63	1.23
Canola	t/ha	1.53	1.23	1.36	1.27	1.22	1.34
Sunflowerseed	t/ha	1.03	1.06	1.25	1.23	1.00	1.09
Soybeans	t/ha	1.92	1.70	2.27	1.97	1.81	1.75
Industrial crops							
Cotton (lint)	t/ha	1.54	1.52	1.27	1.60	1.49	1.59
Sugar cane (for crushing)	t/ha	100	98	97	95	76	81
Tobacco (dried leaf)	t/ha	2.91	2.90	2.91	2.91	2.90	na
Winegrapes	t/ha	11.07	12.19	11.54	10.26	11.81	11.00
Livestock							
Wool a	kg/sheep	4.33	4.22	4.32	4.30	4.31	4.32
Wholemilk	L/cow	4 571	4 582	4 723	4 996	4 628	4 708

a Shorn (including lambs). p Preliminary. f ABARE forecast. na Not available.

Sources: Australian Bureau of Statistics; ABARE.

26 Volume of Australian commodity exports

	Unit	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
Farm							
Grains and oilseeds							
Wheat (unprepared) a	kt	18 348	15 245	16 384	17 274	16 570	17 500
Barley (unprepared) b	kt	4 370	2 982	4 714	3 832	3 881	4 274
Oats (unprepared)	kt	124	155	257	160	97	89
Sorghum	kt	299	251	265	539	691	768
Rice	kt	561	661	637	636	578	912
Lupins	kt	881	972	969	1 312	450	619
Peas c	kt	335	204	207	307	387	218
Chickpeas	kt	342	256	109	217	218	152
Canola	kt	283	590	1 320	1 893	1 479	1 306
Cottonseed	kt	211	296	360	531	658	360
Other oilseeds d	kt	28	22	27	22	53	47
Total	kt	25 782	21 633	25 250	26 723	25 062	26 245
Industrial crops							
Raw cotton e	kt	505	593	647	703	834	668
Sugar	kt	4 309	4 552	3 961	4 131	3 125	3 483
Wine	ML	155	194	216	288	340	419
Meat and live animals for slaughter							
Beef and veal gh	kt	730	821	883	852	959	950
Live cattle i	'000	864	692	713	846	846	855
Mutton g	kt	138	163	155	171	180	171
Lamb g	kt	63	71	85	99	115	110
Live sheep i	'000	5 237	4 961	4 959	4 859	5 936	6 233
Pig meat g	kt	7	12	16	39	44	56
Poultry meat g	kt	12	14	19	17	21	25
Canned meat	kt	8	11	12	10	3	7
Wool							
Greasy js	kt	495	456	384	459	479	423
Semiprocessed	kt (gr.eq.)	297	280	253	271	281	237
Skins	kt (gr.eq.)	61	69	44	72	95	57
Total js	kt (gr.eq.)	853	806	681	803	855	717
Dairy products							
Butter k	kt	99	95	104	124	108	96
Cheese	kt	128	153	175	220	219	237
Casein	kt	6	9	13	14	10	10
Skim milk powder	kt	192	178	220	218	203	214
Wholemilk powder	kt	97	95	126	153	167	187

Continued

26 Volume of Australian commodity exports *(continued)*

	Unit	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
Forest products							
Woodchips	kt	6 752	8 750	7 904	9 365	10 096	9 565
Fisheries products							
Tuna l	kt	5.8	7.6	8.5	12.6	14.8	19.2
Other fish	kt	13.2	16.1	17.6	15.0	13.3	16.0
Prawns m							
Headless	kt	1.8	1.9	1.1	0.9	1.0	1.0
Whole	kt	8.9	10.2	10.6	10.1	10.8	11.2
Rock lobster							
Tails	kt	1.0	1.0	1.5	1.7	1.0	0.9
Whole	kt	11.3	11.1	12.8	13.3	11.9	10.9
Abalone							
Fresh, chilled or frozen	kt	1.4	1.4	1.7	1.7	1.9	1.7
Canned	kt	1.5	1.6	1.7	2.1	1.7	2.2
Scallops n	kt	1.3	1.3	1.6	1.7	2.1	2.3
Mineral resources							
Energy							
Crude oil o	ML	12 401	14 785	14 291	20 877	24 030	23 199
LPG	ML	2 421	2 824	2 486	2 857	2 785	3 252
LNG qs	Mt	7.486	7.650	7.819	7.923	8.021	8.070
Bunker fuel r	ML	2 294	2 203	2 305	2 314	2 291	2 248
Petroleum products	ML	5 041	4 941	4 236	4 116	4 577	4 674
Metallurgical coal	Mt	78.7	84.1	85.3	96.8	105.5	107.6
Thermal coal	Mt	67.1	78.5	84.2	79.0	88.0	93.7
Uranium (U ₃ O ₈)	t	5 701	6 415	5 989	8 025	9 722	10 450

Continued

26 Volume of Australian commodity exports (continued)

	Unit	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
Mineral resources (continued)							
Metalliferous minerals and metals t							
Aluminium t							
Alumina	kt	11 011	10 536	11 059	11 654	12 721	12 993
Aluminium (ingot metal)	kt	1 060	1 233	1 365	1 364	1 471	1 479
Copper							
Ore and concentrate	kt	890	1 097	1 227	936	1 152	970
Refined	kt	128	127	160	306	366	422
Gold v							
Australian origin	t	277.2	359.1	299.2	264.4	257.2	293.3
Overseas origin	t	34.9	68.5	121.8	65.4	44.6	59.8
Total	t	312.1	427.7	421.0	329.8	301.8	353.1
Iron and steel							
Iron ore and pellets	Mt	137.6	142.2	135.2	149.4	157.3	164.5
Iron and steel w	kt	3 212	3 347	3 332	2 941	2 513	3 114
Lead							
Ores and concentrates	kt	178	253	397	436	433	440
Refined	kt	177	177	201	258	199	225
Bullion	kt	164	167	140	135	119	128
Manganese							
Ore s	kt	1 797	1 147	1 125	1 301	1 516	1 752
Nickel vs	kt	138	161	151	177	187	210
Titanium							
Ilmenite concentrate x	kt	1 147	1 304	1 216	1 133	1 012	991
Leucoxene concentrate	kt	36	24	18	41	70	39
Rutile concentrate	kt	186	207	188	179	190	210
Synthetic rutile s	kt	351	476	381	369	443	482
Titanium dioxide pigment	kt	130	136	133	135	140	133
Silver v	t	1 278	1 384	1 850	1 850	1 850	1 850
Tin v	t	9 395	10 550	10 002	9 934	9 660	8 892
Zinc							
Ores and concentrates	kt	1 555	1 450	1 729	1 496	1 902	1 880
Refined	kt	228	198	274	317	391	460
Zircon concentrate y	kt	382	396	364	365	363	407
Other minerals							
Diamonds	'000 ct	52 521	42 483	51 244	40 001	25 513	29 241
Salt	kt	7 605	8 444	8 710	8 389	8 636	8 313

a Includes the wheat equivalent of flour. b Includes the grain equivalent of malt. c Includes field peas and cowpeas. d Includes soybeans, linseed, sunflowerseed, safflowerseed and peanuts. Excludes meals and oils. e Excludes cotton waste and lintens. g In shipped weight. Fresh, chilled or frozen. h Includes meat loaf. i Excludes breeding stock. j ABS recorded trade data adjusted for changes in stock levels held overseas by Wool International. k Includes ghee, dry butterfat, butter concentrate and butteroil, dairy spreads, all expressed as butter. l Exports of tuna landed in Australia. Tuna captured under joint venture or bilateral agreements or transhipped at sea is not included. m Excludes volume of other prawn products. n Includes crumbed scallops. o Includes condensate and other refinery feedstock. q 1 million tonnes of LNG equals about 1.31 billion cubic metres of gas. r International ships and aircraft stores. t Uranium is included with energy. u Exports of bauxite are confidential. v Quantities refer to total metallic content of all ores, concentrates, intermediate products and refined metal. w Includes all steel items in ABS, *Australian Harmonized Export Commodity Classification*, ch. 72, 'Iron and steel', excluding ferrous waste and scrap and ferroalloys. x Excludes leucoxene and synthetic rutile. y Data from 1991-92 refer to standard grade zircon only. p Preliminary. f ABARE forecast. s ABARE estimate. Sources: ABS, *Foreign Trade: Magnetic Tape Service*, cat. no. 5464.0, Canberra; Australian Mining Industry Council; Department of Foreign Affairs and Trade; Department of Agriculture, Fisheries and Forestry Australia; ABARE.

27 Value of Australian commodity exports (fob)

	1996-97 \$m	1997-98 \$m	1998-99 \$m	1999-00 \$m	2000-01 p \$m	2001-02 f \$m
Farm						
Grains and oilseeds						
Wheat (including flour)	4 346	3 687	3 467	3 481	4 197	4 762
Barley (including malt)	999	726	877	822	1 029	1 178
Oats	26	30	38	27	22	25
Sorghum	70	50	46	81	122	136
Rice	318	402	417	386	366	553
Lupins	195	193	171	230	122	108
Peas a	97	67	63	90	112	70
Chickpeas	120	118	50	101	113	89
Canola	124	256	558	638	544	729
Cottonseed	45	68	91	122	137	92
Other oilseeds b	21	20	24	28	28	82
Total	6 362	5 618	5 800	6 008	6 790	7 824
Industrial crops						
Raw cotton c	1 077	1 386	1 559	1 407	1 957	1 352
Sugar	1 546	1 706	1 289	1 092	1 156	1 172
Wine	599	813	991	1 352	1 630	1 995
Total	3 222	3 904	3 839	3 851	4 743	4 519
Other crops	2 160	2 297	2 485	2 777	3 144	3 260
Total crops	11 743	11 820	12 124	12 637	14 678	15 603
Meat and live animals for slaughter						
Beef and veal d	2 071	2 610	2 863	3 119	4 007	4 127
Live cattle e	428	333	343	433	482	500
Mutton d	288	369	309	326	416	434
Lamb d	243	276	321	376	504	524
Live sheep e	190	193	182	180	258	348
Pig meat	33	52	71	159	186	262
Poultry meat	14	18	23	21	26	30
Canned meat d	34	47	53	50	16	44
Total	3 301	3 898	4 163	4 663	5 894	6 271
Wool						
Greasy g	2 188	2 336	1 457	1 796	2 310	2 120
Semiprocessed	1 292	1 378	994	1 031	1 289	1 146
Skins	264	307	132	136	298	199
Total g	3 744	4 020	2 583	2 963	3 897	3 465
Dairy products						
Butter	220	238	294	291	291	229
Cheese	476	607	695	807	950	1 271
Casein	33	43	67	81	89	74
Skim milk powder	473	444	496	478	694	856
Wholemilk powder	268	275	364	403	580	763
Other dairy products	309	329	341	380	442	457
Total	1 779	1 937	2 257	2 439	3 047	3 650
Other livestock exports	1 302	1 417	1 444	1 452	1 883	1 941
Total livestock exports	10 127	11 271	10 447	11 517	14 721	15 326
Total farm exports	21 870	23 090	22 571	24 154	29 400	30 929

Continued

27 Value of Australian commodity exports (fob) (continued)

	1996-97 \$m	1997-98 \$m	1998-99 \$m	1999-00 \$m	2000-01 p \$m	2001-02 f \$m
Forest products						
Woodchips	518	646	586	646	744	674
Other products	660	678	708	930	1 068	999
Total	1 179	1 324	1 293	1 576	1 812	1 650
Fisheries products						
Tuna h	67	104	120	259	332	468
Other fish	115	129	154	134	146	163
Prawns i						
Headless	33	41	25	21	25	26
Whole	147	189	196	209	259	288
Rock lobster						
Tails	50	64	76	95	60	56
Whole	399	359	373	472	461	429
Abalone						
Fresh, chilled or frozen	75	82	87	102	134	111
Canned	94	110	98	121	116	127
Scallops j	37	36	33	42	53	58
Pearls	192	286	272	436	419	444
Other fisheries products	95	89	78	96	164	76
Total	1 305	1 489	1 511	1 988	2 168	2 245
Total rural exports k						
Derived as sum of above	24 354	25 904	25 376	27 718	33 380	34 825
On balance of payments basis l	23 688	25 256	24 681	26 689	32 062	33 779
Mineral resources						
Energy						
Crude oil m	2 119	2 251	1 881	5 292	8 131	5 670
LPG	356	367	297	648	830	681
LNG	1 537	1 599	1 425	1 949	2 671	2 550
Bunker fuel n	547	505	397	666	899	650
Other petroleum products	1 147	1 097	866	1 202	1 849	1 403
Metallurgical coal	4 814	5 742	5 472	5 184	6 596	7 853
Thermal coal	3 118	3 790	3 767	3 114	4 202	5 402
Uranium (U ₃ O ₈)	245	288	288	367	497	550
Total						
Derived as sum of above	13 883	15 639	14 393	18 422	25 677	24 760
On balance of payments basis (excl. bunker fuel)	13 159	14 895	13 749	17 418	24 297	23 634
Metalliferous minerals and metals						
Aluminium						
Bauxite s	104	120	135	185	196	144
Alumina	2 604	2 887	2 910	3 471	4 507	3 904
Aluminium (ingot metal)	2 088	2 828	2 840	3 302	4 229	3 804
Copper o						
Ore and concentrate	655	822	968	776	1 040	807
Refined	352	372	398	840	1 249	1 183

Continued

27 Value of Australian commodity exports (fob) (continued)

	1996-97	1997-98	1998-99	1999-00	2000-01 p	2001-02 f
	\$m	\$m	\$m	\$m	\$m	\$m
Mineral resources (continued)						
Metalliferous minerals and metals (continued)						
Gold o						
Australian origin	4 179	5 234	4 470	3 815	4 156	4 537
Overseas origin	527	1 008	1 847	988	731	926
Total	4 706	6 242	6 317	4 803	4 887	5 464
Iron and steel						
Iron ore and pellets	3 155	3 791	3 844	3 779	4 901	5 559
Iron and steel	1 385	1 608	1 316	1 268	1 277	1 332
Lead o						
Ores and concentrates	54	140	213	264	318	320
Refined	201	173	180	187	167	224
Bullion	214	179	144	155	148	162
Manganese						
Ore s	231	157	165	185	260	326
Titanium						
Ilmenite concentrate q	114	139	142	151	154	152
Leucoxene concentrate	19	15	9	16	21	16
Rutile concentrate	136	160	148	131	161	179
Synthetic rutile s	184	274	251	226	317	347
Titanium dioxide pigment	256	346	387	404	494	467
Nickel s	1 072	1 103	845	1 862	2 049	1 817
Refined silver	69	94	112	129	142	180
Tin o	57	75	73	70	76	65
Zinc o						
Ores and concentrates	491	581	690	682	981	933
Refined	353	407	444	550	782	714
Zircon concentrate r	230	231	187	176	221	274
Total	18 812	22 820	22 810	23 663	28 600	28 704
Other minerals						
Diamonds s	396	538	598	601	634	668
Salt	168	211	222	221	253	260
Other	3 181	1 977	1 155	1 512	1 272	1 252
Total mineral resources exports	36 441	41 184	39 178	44 419	56 435	55 645
Total commodity exports						
Derived as sum of above	60 794	67 088	64 554	72 137	89 815	90 469
On balance of payments t	59 582	65 935	63 462	70 442	87 598	88 774

a Field peas and cowpeas. b Includes soybeans, linseed, sunflowerseed, safflowerseed and peanuts. Excludes meals and oils. c Excludes cotton waste and linters. d Based on quantity data from the Department of Agriculture, Fisheries and Forestry Australia and export price data from the ABS. e Excludes breeding stock. g On a balance of payments basis. ABS recorded trade data adjusted for changes in stock levels held overseas by Wool International. h Exports of tuna landed in Australia. Tuna captured under joint venture or bilateral agreements or transhipped at sea is not included. i Other prawn products included in other fisheries products. j Includes crumbed scallops. k Sum of farm, forest and fisheries products. l The value of exports derived as the sum of published detailed items differs from the balance of payments aggregates shown in table 6 for two main reasons: the ABS makes special adjustments to some recorded trade data for balance of payments purposes; and ABARE derives its own estimates, (using non-ABS sources), for several items as footnoted. For more detail on a balance of payments basis, see table 7. m Includes condensate and other refinery feedstock. n International ships and aircraft stores. o Value of metals contained in host mine and smelter products are not available separately and are included in the value of the mineral product or metal in which they are exported. q Excludes leucoxene and synthetic rutile; data from 1991-92 refer to bulk ilmenite only. r Data from 1991-92 refer to standard grade zircon only. t As derived in table 6. p Preliminary. f ABARE forecast. s ABARE estimate.

Sources: ABS, *Foreign Trade: Magnetic Tape Service*, cat. no. 5464.0, Canberra; ABARE.

28 Value of Australian imports and exports of selected commodities

	1996-97	1997-98	1998-99	1999-00	2000-01 ^p
	\$m	\$m	\$m	\$m	\$m
Vegetable oilseeds and products ^a					
Imports	363	361	372	355	376
Exports	204	394	750	837	743
Dairy products					
Imports					
Cheese	135	141	139	133	149
Other dairy products	44	62	97	84	105
Total	179	203	236	216	254
Exports					
Cheese	476	607	695	807	950
Other dairy products	1 304	1 330	1 562	1 633	2 097
Total	1 779	1 937	2 257	2 439	3 047
Edible fisheries products					
Imports					
Shellfish ^b	254	295	303	317	361
Fish	349	395	442	463	509
Total	603	690	745	781	870
Exports					
Shellfish ^b	903	948	949	1 143	1 238
Fish ^c	183	234	275	393	478
Total	1 086	1 181	1 224	1 536	1 716
Forest products					
Imports					
Sawnwood	374	423	417	548	428
Wood based panels	125	145	142	189	152
Pulp and paper products	1 924	2 146	2 305	2 583	2 792
Other ^d	300	356	398	477	462
Total	2 723	3 070	3 262	3 797	3 834
Exports					
Woodchips	518	646	586	646	744
Pulp and paper products	430	459	443	598	657
Other ^e	230	219	264	332	411
Total	1 179	1 324	1 293	1 576	1 812
Petroleum					
Imports					
Crude oil ^g	4 233	3 707	3 794	6 313	8 680
Petroleum products ^h	955	766	868	1 375	1 780
Total	5 187	4 473	4 662	7 688	10 460
Exports					
Crude oil ^g	2 119	2 251	1 881	5 292	8 131
LPG ⁱ	356	367	297	648	830
LNG	1 537	1 599	1 425	1 949	2 671
Bunker fuel ^j	547	505	397	666	899
Other petroleum products	1 147	1 097	866	1 202	1 849
Total	5 706	5 819	4 866	9 758	14 381

^a Includes peanuts, oilseeds, vegetable oils and vegetable protein meals. ^b Includes all crustaceans and molluscs including canned. ^c Excludes tuna transhipped at sea or captured under joint venture or bilateral agreements. ^d Includes roundwood, other processed wood and minor forest products. ^e Includes roundwood, sawnwood, sleepers, processed wood and minor forest products. ^g Includes condensate and other refinery feedstock. ^h Includes LPG. ⁱ Naturally occurring and refinery byproduct gas. ^j International ships and aircraft stores. ^p Preliminary.

Sources: Australian Bureau of Statistics; Department of Agriculture, Fisheries and Forestry Australia; ABARE.

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