Australia is the world’s largest exporter of coal, accounting for around 32 per cent of world hard coal trade in 1997. The growth in the Australian coal industry has reflected a number of advantages including proximity to markets such as Japan, as well as abundant reserves relatively close to ports. The current Australian coal industry is characterised by a large number of private companies competing actively with each other and with low cost producers in other countries. Australian producers are now facing considerable pressures to reduce costs as a result of sustained falls in prices.

The fundamental question facing Australia’s coal customers at this time of considerable market uncertainty, therefore, is how will the Australian industry respond over the medium term to pressures on its prices and profitability? This year, despite a significant fall in the world price of coal, Australian producers have been protected by a large exchange rate depreciation. If the exchange rate begins to appreciate (as ABARE assumes) and US dollar prices continue to ease, Australian coal production may still increase in the short term. However, in the longer term, it is expected that investment will be adversely affected and as a result growth in Australian coal production may be slower than previously expected.

Clearly the international coal market is characterised by falling real prices in the long term. In the main, these reflect decreasing marginal costs of production around the world. As a result, Australia’s future coal supply will also depend on its success in reducing costs. Significant progress in reducing rail freight costs and improving productivity are likely to allow the Australian coal industry to meet the supply challenge over the medium term.
Introduction

Australia is a very important participant in the world coal market. Australia is the world’s largest exporter of coal, accounting for around 32 per cent of world hard coal trade in 1997. Most Australian coal is exported to Asia where it supplies 50 per cent of total Asian imports. Japan is by far Australia’s most important customer receiving 46 per cent of Australia exports.

Australian coal production has grown rapidly over the past four decades, increasing at an average rate of 6.4 per cent a year from 21.9 million tonnes in 1960 to 216.9 million tonnes in 1997 (figure 1). Growth in production has largely been export driven, with exports growing at an average rate of 13 per cent a year compared to a rate of 3 per cent a year for domestic consumption. The growth in the Australian coal industry has reflected a number of advantages including proximity to markets such as Japan, as well as abundant reserves of high quality coal relatively close to ports.

The current Australian coal industry is characterised by a large number of private companies competing actively with each other and with low cost producers in other countries. Australian producers are now facing considerable pressures to reduce costs as a result of sustained falls in prices.

Against that background, the focus in this paper is the outlook for Australian coal supply. The advantages of and impediments to the Australian coal industry are discussed with a view to assessing the likely responsiveness of Australian coal supply in the next five years.

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Figure 1: **Australian coal production and exports**

<table>
<thead>
<tr>
<th>Year</th>
<th>Mt</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961-62</td>
<td>50</td>
</tr>
<tr>
<td>1965-66</td>
<td>70</td>
</tr>
<tr>
<td>1969-70</td>
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<td>1973-74</td>
<td>82</td>
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<td>1977-78</td>
<td>94</td>
</tr>
<tr>
<td>1981-82</td>
<td>90</td>
</tr>
<tr>
<td>1985-86</td>
<td>98</td>
</tr>
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<td>1989-90</td>
<td>50</td>
</tr>
<tr>
<td>1993-94</td>
<td>50</td>
</tr>
<tr>
<td>1997-98</td>
<td>50</td>
</tr>
</tbody>
</table>
Development of the Australian coal industry

The fundamental advantages that have allowed the Australian coal industry to expand over the past forty years are Australia’s:

- abundant and relatively accessible reserves of high quality coal;
- a skilled workforce and available economic and social infrastructure; and
- proximity to the rapidly growing Asian market.

Australia is ranked sixth in terms of total world economic demonstrated reserves of black coal (table 1), with approximately 7 per cent of the total reserves in the world (Bureau of Resource Sciences 1997).

Resources are concentrated close to ports in the Bowen Basin in Queensland (which contains 47 per cent of Australia’s reserves) and the Sydney Basin in New South Wales (which contains 50 per cent). Australia’s black coal reserves amount to over 68 billion tonnes of coal, 72 per cent, or 49 billion tonnes, of which have been classified as economically recoverable (Bureau of Resource Sciences 1997). Economically recoverable reserves are equivalent to over 230 years of raw coal production at current rates.

The average distance to ports in New South Wales and Queensland are 135 and 250 kilometres respectively (table 2) compared, for example, with average distances of 1100 kilometres in Canada and 580 kilometres in South Africa.

While opencut mines supply 71 per cent of production, some 60 per cent of Australia’s coal resources are unsuited to open cut mining and will require underground mining methods (Barlow Jonker 1997). As a result, the trend of recent years toward a higher proportion of open cut mines is expected to be reversed in time, as more (potentially higher cost and lower volume) underground mines are commissioned. However, the

---

**Table 1: World coal reserves a**

<table>
<thead>
<tr>
<th>Country</th>
<th>Reserves (Gt)</th>
<th>Production (Mt)</th>
<th>Production to reserves (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>209.1</td>
<td>776.4</td>
<td>269.4</td>
</tr>
<tr>
<td>CIS</td>
<td>141.0</td>
<td>418.6</td>
<td>336.8</td>
</tr>
<tr>
<td>China</td>
<td>95.9</td>
<td>1154.0</td>
<td>83.1</td>
</tr>
<tr>
<td>India</td>
<td>68.0</td>
<td>249.0</td>
<td>273.1</td>
</tr>
<tr>
<td>South Africa</td>
<td>55.3</td>
<td>182.2</td>
<td>303.5</td>
</tr>
<tr>
<td>Australia</td>
<td>52.0</td>
<td>224.2</td>
<td>232.0</td>
</tr>
<tr>
<td>Poland</td>
<td>29.1</td>
<td>130.5</td>
<td>223.0</td>
</tr>
<tr>
<td>Germany</td>
<td>24.0</td>
<td>64.2</td>
<td>373.8</td>
</tr>
<tr>
<td>Total</td>
<td>674.4</td>
<td>3199.1</td>
<td>210.8</td>
</tr>
</tbody>
</table>


**Table 2: Average distance from the mine to port**

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Average distance (km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queensland</td>
<td>135</td>
</tr>
<tr>
<td>New South Wales</td>
<td>250</td>
</tr>
<tr>
<td>United States</td>
<td>600–300</td>
</tr>
<tr>
<td>South Africa</td>
<td>580</td>
</tr>
<tr>
<td>Canada</td>
<td>1100</td>
</tr>
</tbody>
</table>

*Source: IEA Coal Research 1993.*
expansion of the share of underground mining is expected to take some years to establish, as current advanced plans for new mining projects in Australia indicate (Haine et al. 1998).

The capacity of Australian coal export facilities has expanded to match production and is expected to continue to expand to accommodate production growth. In the five years to 1997 Australian coal port capacity rose almost 19 per cent to 191 million tonnes. Capacity in 1997 represented excess capacity of over 20 per cent in 1997. Excess capacity is required to accommodate the high variability in vessel arrivals.

It is Australia’s proximity to Asia in general and Japan in particular which has perhaps provided the main stimulus to growth in Australian coal production. Coal transport costs account for a substantial proportion of the landed price of coal. Before 1970, growth in Australian coal production was driven largely by rising demand for coking coal from the expansion of the Japanese steel industry. During and after the 1970s, thermal coal demand grew rapidly in the Asian region, as a result of the oil shocks and rapid industrialisation. Continuing growth in electricity demand and expansions in the steel industry in Japan and elsewhere in Asia have confirmed Australia’s role as the major coal supplier to the region, although other suppliers such as South Africa, Indonesia and China have significantly increased their importance in recent years.

Current state of the Australian coal industry

Australia’s fundamental cost advantages have led to the development of a large export oriented coal industry. It is Australia’s largest commodity export industry, doubling its export earnings over the past decade to reach A$9.5 billion dollars in 1997-98. It is also a very competitive industry. In 1997 there were 118 mines producing 217 million tonnes of coal. The Australian industry is characterised by a large number of companies competing vigorously with each other and with overseas rivals for market share.

A recent development, with potentially important implications for market structure and the price formation process and hence for investment decisions in the industry, has been the changes in the benchmark price system. The associated increasing importance of the spot market has eroded premiums paid by consumers for security of supply, placed increased economic pressure on producers and raised questions about the future supply responses of major coal producers.

Although the largest four coal companies in Australia control about half of Australian coal production, there are many smaller medium sized producers which significantly affect the market. Competitive pressures on the Australian coal industry also include those from producers in other countries, particularly Indonesia in the Asian market. Low transport costs and substantial reserves have led to a rapid increase in Indonesian coal exports in direct competition with Australia in the thermal coal market.
Similarly, exports from China have increased considerably in recent years, from around 17 million tonnes in 1990 to around 31 million tonnes in 1997. China is expected to continue to increase exports as it develops its port and rail facilities. For example, recently announced plans indicate that development of facilities at Tianjin port could allow for additional export capacity of up to 12 million tonnes by 2000 (Coal Week International 1998).

Asian coal imports increased at an average rate of 7 per cent a year in the past fifteen years. However, the competitive nature of the Australian coal industry and of its world markets resulted in real benchmark prices falling through this period at an average rate of around 4.5 per cent a year in the Asian region. Initially, price falls reflected a retreat from the high prices induced by the oil shocks of the 1970s. More recently, however, real price falls have also reflected the increasing international competition in supply and progressively lower marginal costs of mining. In the past two years the rate of real price decline in world markets has accelerated significantly, primarily as a result of excess supply. More recently this has also reflected lower demand and increased market uncertainty associated with the Asian economic turmoil.

There is evidence that, in the past few years, the real price of coal has declined faster than the rate of decline in costs of production for a significant part of the Australian industry. This has further reduced the already modest profitability of coal mining in Australia. For example, a regular survey by the New South Wales Minerals Council found that the companies accounting for 70 per cent of New South Wales production returned an average operating profit of 56 cents a tonne in 1996-97 (New South Wales Minerals Council 1998). Similarly, return on shareholders funds fell from 8.8 per cent in 1995-96 to 2 per cent in 1996-97 (figure 2).
This indicates that most of the industry is now under a great deal of pressure and substantial and fundamental structural adjustment is under way. It has led to widespread reduction of mine workforces and some mine closures. In 1997 employment in the Australian coal industry fell by 6.1 per cent (that is, by 1600 jobs) to 24 640 (figure 3). Employment continued to fall in the first quarter of 1998, decreasing by a further 682 employees or an additional 2.8 per cent fall since the end of 1997.

The pressures faced by the industry are reflected in the Australian government’s decision in 1997 to undertake a special inquiry into the Australian black coal industry. The broad purpose of the inquiry, being conducted by the Productivity Commission, is to consider ways in which the Australian coal industry can improve its competitiveness in the emerging market environment. Initial findings by the Productivity Commission indicate that the Australian coal industry needs to undergo significant further change if it is to increase profitably.

On the other hand, the effects of the most recent world price declines on the Australian coal industry have been substantially mitigated by the concurrent sharp depreciation of the Australian dollar. As figure 4 indicates, in Australian dollar terms, historically the benchmark price has been the main influence export earnings by the Australian coal industry. It has been a good indicator of price trends faced by the industry. Current benchmark contract prices (covering Japanese fiscal year 1998) are down by between 5 and 10 per cent from the previous year. While Australian dollar prices fell in 1996 and 1997, the depreciation of the Australian dollar against the US dollar in 1998 has meant that, in real terms, benchmark prices in Australian dollar terms are likely to firm. Despite this currency protection of earnings in 1998, the impact of the price decreases in the preceding years, the recent downward pressure on US dollar prices and the expected

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**Figure 3: Total employment in Australian coal industry**

<table>
<thead>
<tr>
<th>Year</th>
<th>NSW</th>
<th>Queensland</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>10</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>1991</td>
<td>12</td>
<td>17</td>
<td>6</td>
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<td>1992</td>
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<td>1996</td>
<td>22</td>
<td>27</td>
<td>11</td>
</tr>
<tr>
<td>1997</td>
<td>24</td>
<td>29</td>
<td>12</td>
</tr>
</tbody>
</table>
sustained pressure on prices in the future may be expected to have significant longer term implications for the economics of Australian supply.

The price responsiveness of Australian coal supply

A fundamental question facing Australia’s coal customers at this time, therefore, is how will the Australian industry respond over the medium term to the growing pressures on its prices and profitability? If real prices continue to fall is there reason to believe Australia will soon begin reducing supply? Analysis of patterns of supply of Australian coal suggests that the responsiveness of Australian coal supply to changes in the real price of coal is different depending on the period of time over which producers can react.

Short term responsiveness

In the short term (1–2 years) the Australian industry appears to be relatively unresponsive to price changes. For example, Australian production did not fall with the decline in real coal prices of 1996 and 1997; coal production actually increased 12 per cent over the period. This short term unresponsiveness in coal production reflects a number of influences.

In some circumstances, exchange rate hedging may contribute to the lack of responsiveness in production to a change in the Australian dollar price of coal. Hedging fixes the exchange rate received by the producer in order to avoid the risk of changes in that rate. If a change in domestic price comes about because of a sustained change in the exchange rate, a hedged producer may be protected in the short term, typically for up to a year.

More generally, the lack of price responsiveness in the short term indicates that Australian producers and their sources of funds take a long term view of the market when investing
in the Australian coal industry. The investments are typically large, and once they are made, most are ‘sunk’. As a result, an unexpected and apparently temporary fall in the real price of coal may not cause producers to reduce production if the cost of temporary closure and reopening is greater than the costs of continuing operations in the short term. That is, in these circumstances a coal mine may continue to operate even if price is below marginal costs.

There are several reasons why the costs of temporary mine closure may be large. One reason is that the temporary dispersal of labor is typically difficult and costly, involving redundancy payouts and the possibility of industrial disputation. The cost and time associated with decommissioning mine equipment, such as a longwall, raises the cost of mine closure. There are also a number of safety, maintenance and environmental issues such as the buildup of combustible gases, dust control and flooding, which mean that costs of care and maintenance staff must continue to be met.

If high costs of closure mean that producers choose not to close down capacity then they are likely to increase their commitment to reduce costs to mitigate impacts on profits. One way in which mines may reduce costs is by maintaining or increasing production with less labor. Employment trends suggest this has been taking place in Australia for some time (figure 3).

Any mine closures would provide an offsetting effect. Although most operating Australian mines have substantial remaining reserves, it is expected that higher cost mines that are nearer the end of their lives may choose to close down if their revenues fall below marginal cost for a significant period.

As a result of such influences, Australian coal supply tends not to fall significantly following a decline in coal prices in the short term. On the other hand, a shorter term increase in coal prices would not be expected to significantly increase production either. The main impediment to significant increases in production in the short term is the time and cost involved in building a new mine or installing new capital equipment. Construction of new mines, even from plans for which an up to date final feasibility study exists, would still take between 6 and 18 months from a decision to proceed. However, there are likely to be a number of mines which can successfully expand production in the shorter term by increasing capacity utilisation, by making modest investments or by reopening parts of the mine which may have been closed down in the past.

**Long term responsiveness**

In contrast to the mixed but typically muted supply response in the short term, Australian coal production is expected to be highly responsive to price changes in the longer term (beyond two years).
Expectations about the profitability of a potential project are the main determinant of the timing of investment. Profit expectations will be formed based on expectations about future costs and prices. Costs tend not to fluctuate as much as prices but can have a significant influence in the longer term. Their influence is discussed later. Price expectations may be affected by a range of factors over time; however, a sustained period where prices fall below their long term trend will generally lower expectations about future prices, deterring investment.

If price expectations remain low for an extended period, production may be expected to fall for a number of years as mines with lower reserves and higher marginal costs close down and investment in new mines stops. Similarly, a sustained increase in coal prices would be expected to lead to a significant increase in production. The production impact depends primarily on the length of period that price expectations remain high.

**Trends in the price responsiveness of coal production**

As noted above, the recent experience of the Australian coal industry (past three years) is one in which prices in US dollars across all grades of coal have fallen, and profitability is low in a large part of the industry. However, the recent depreciation of the Australian dollar has meant that real benchmark prices have only fallen in Australian dollar terms for two years in the case of thermal and semisoft coking coals, and one year in the case of hard coking coal. US dollar benchmark prices are not expected to increase in the short term, as current contract prices extend until March next year and market conditions suggest further downward pressure on prices will be exerted in the next round of contract price negotiations for Japanese fiscal year 1999.

The price trends of recent years resemble the behavior of prices in the mid to late 1980s in important respects (figure 5). After peaking in 1982, benchmark prices in real US dollars
between Australia and Japan for all grades of coal fell for five consecutive years to 1987. The influence of the exchange rate was crucial during this period as well, cushioning the impact of the price decreases in US dollars, so that in Australia dollar terms the price only fell in 1982, 1983 and the three consecutive years to 1988. During this period Australian production continued to rise year on year until 1988, when Australian production fell by 2.7 per cent. After 1988 Australian dollar benchmark prices gradually improved and production rose again.

The main differences between the price trends in the mid-1980s and recent price trends is that recent price falls have not been as great in Australian dollar terms and the depreciation of the exchange rate over the past year has interrupted the down trend in Australian dollar prices established over the previous two years.

Looking forward, changes in Australian production in the next five years will mainly depend on price expectations which are forming now and those that will be formed in the next couple of years. As a result, movements in benchmark prices and, very importantly, in the value of the Australian dollar relative to the US dollar over this period, will play key roles in determining the medium term outlook for Australian production. At this time, ABARE assumes that the Australian dollar will rise significantly against the US dollar in 1999-2000 and beyond, after remaining low in 1998-99 (figure 6).

**Outlook for coal prices**

In nominal terms the average export unit value of all Australian coal exports increased sharply in the 1970s during the oil shocks but has remained at a level of around A$50–55 a tonne since the 1980s. Despite upward pressures on coal costs from the cost of materials and wages and the increasing depth of many mines, average mining costs have eased as a result of increased productivity and improved technology.
Over the longer term, it can reasonably be assumed that the real price of internationally traded coal will fall as costs of production continue to fall. In addition, competition from abundant coal reserves in a geographically diverse range of countries, and strong competition in the provision of seaborne transport mean that further falls in the cost of traded coal are likely.

Furthermore, coal will be under increasing pressure as a result of competition with other sources of energy, such as oil, gas, nuclear and renewables, in an increasingly emissions conscious energy world. As a result of the Kyoto agreement the emission targets for greenhouse gases, the long term outlook for coal imports by developed countries is expected to be affected. In Japan, Australia’s largest coal export market, the detail of the response to agreed greenhouse gas reduction targets remains somewhat uncertain due, among other things, to the costs and social and infrastructure challenges associated with fundamental changes in the fuel mix.

Outlook for supply

Current price trends and the pressures on the Australian coal industry have created significant uncertainty regarding the outlook for Australian coal supply.

In 1997 ABARE presented an examination of the outlook for Australian coal supply over the medium term to an international audience in Singapore. Projections of Australian coal supply at that time were developed from a survey of planned coal mining projects at various advanced stages of commitment (Middleton and Graham 1997). That survey identified 84 million tonnes of additional coal production capacity in Australia, including 37 million tonnes from projects to which industry indicated it was ‘committed’, with the remainder from projects at less advanced stages of commitment. This development was expected to contribute to an average rate of growth in Australian production of around 4 per cent a year to 252 million tonnes in 2002.

Since that time a lot has happened in the market. A number of mine development projects appear to have been put on hold or postponed. The real level of company commitment to investment plans has become very difficult to assess accurately in recent market conditions. As a result, such ‘bottom up’ methods of projecting new production are thought to be unreliable at this time.

ABARE prepares formal medium term projections which are released at the Outlook conference early each year. At the annual conference in February this year, with evidence that proposed coal projects had been postponed in light of the fall in 1998 benchmark prices and the uncertainty from the downturn in Asian economic growth, ABARE’s forecasts were revised downwards. Australian production was forecast at that time to grow at an average rate of 2.6 per cent a year to 240.7 million tonnes in 2003.
However, these forecasts have been revealed to have been based on an optimistic view of prices and exchange rates. During 1998, spot prices have continued to fall, more Australian mines have closed and investment in new coal mining capacity continues to be postponed. The trend in the value of the Australian dollar over the medium term will be a key influence on the prices received by Australian producers. If the declines in real benchmark prices for coal in recent years were to continue, a rising exchange rate over the period would amplify the decline in the average Australian dollar export price for coal.

As noted earlier, Australia dollar export returns to Australian coal producers have been prevented from falling sharply this year by a sharp offsetting fall in the value of the Australian dollar. However, ABARE assumes that the value of the Australian dollar will soon begin to rise. In order to highlight the implications of a rising Australian dollar value for prices received by Australian producers (and, by implication, for future supply), a flat US dollar price scenario is illustrated in figure 7.

Figure 7 shows that even if benchmark prices for coal are assumed to remain flat from Japanese fiscal year 1998 onwards, the average export price in Australian dollars falls sharply from 1999-00, as a result of assumed stronger A$/US$ exchange rate.

Under these assumptions, between 1997-98 and 2002-03 the average real export unit value of Australian coal falls at an average annual rate of 6.6 per cent or by almost 30 per cent over the period. This compares with an average annual rate of decline in real prices over the past decade of around 1.3 per cent. Such a price path in Australian dollar terms would be expected to lead to further delays to investment in new Australian coal mines. Unless world coal prices firm over the medium term, growth in Australian production may be slower than that forecast in February this year.

Figure 7: Average export unit value of Australian coal assuming flat benchmark prices
In 1997-98 Australian dollar
ABARE will begin the process of developing its medium term forecasts for publication at OUTLOOK 99, in March 1999. Whatever prices eventuate, investment in Australian coal production may be relatively higher (lower) in the medium term if growth in productivity increases faster (slower) than it has in the past. Falling employment levels in the Australian coal industry and other significant signs of stress in the industry indicate that an important process of change in productivity is currently taking place. However, at this time, it is difficult to predict how soon and to what extent the Australian industry will reap the benefits of such change.

Microeconomic reform and productivity improvements
The review of the industry being undertaken by the Productivity Commission is providing indicators as to the manner in which such productivity change may be expected to take place.

The main cost factors expected to influence the outlook for Australian coal supply are changes to rail freights and productivity, particularly with respect to work arrangements. Four of six draft recommendations by the Productivity Commission relate to these topics. While other factors such as the cost of loading coal at the port and mine equipment costs are important, rail freight charges and productivity enhancing improvements to work arrangements are viewed as offering the largest opportunities for reducing average costs of production and thereby increasing the competitiveness of Australian coal supply.

Despite relatively short domestic transport distances to port, average coal freight charges account for around 15 per cent of the fob cost of exported coal. As a result, any significant lowering of coal freight charges could lead to an increase in Australian coal supply, assuming other factors constant.

Two main impediments to lower coal freight rates are charging practices and a lack of competition leading to poor rail productivity growth. These two areas have been a significant issue in the coal industry for many years, although significant reform has taken place (see, for example, Cox, Barnes and Hancock 1990; and Taylor 1994). Generally, studies have concluded that the practice of charging freight rates in excess of the full cost of providing the service can lead to distortions in investment and that charges should be determined on a commercial and transparent basis. In addition, it is concluded that railway productivity should be benchmarked against world’s best practice and increasing competition, via third party access to the infrastructure, would support a more efficient rail service.

While significant steps toward such goals have been taken, the process remains incomplete. The New South Wales and Queensland governments have indicated that introduction of rail freight charging on a commercial basis is to begin in 2000. The New South Wales and
Queensland governments have also made some progress toward the introduction of competition in rail services but the process of developing a framework for third party access has been slow and as a result the ultimate timing of such reforms remains uncertain.

The challenge of improving Australian mining productivity in order to reduce costs has also received greatly increased attention in recent years. As with rail transport reform, substantial progress has been made (such as the devolution of workplace agreements to the enterprise level). However, the historical trend of increasing competition in global supply and falling real world prices demonstrates clearly that the Australian industry must continue to reduce costs if it is to grow. This is increasingly recognised by the industry.

New mines or mines that have recently started production have an advantage in achieving change in work practices. Such mines have the opportunity to negotiate innovative work arrangements with their (potential) workforce before beginning operations. The Ensham mine in Queensland is an example of a recently started mine that was able to successfully negotiate relatively flexible work arrangements before operations began (Foots 1998).

Many older mines which have not adopted practices such as contract mining have been successful in cutting costs through improved productivity management, such as via benchmarking of specific mining operations against mines with best practice performance, including mines outside Australia.

Despite such successes, there remains considerable scope to further improve productivity in the Australian coal industry, as residual restrictive work arrangements remain in many mine enterprise agreements throughout the industry. It is expected that in the long run these work practices will gradually change, as increasing competition in regional coal supply forces further cost reductions.

Some mines will achieve productivity changes faster than others and some changes are taking place at considerable cost. As a result it is particularly difficult at this time to predict how the cost of Australian coal production will change and how quickly Australian coal supply will respond.

**Conclusions**

The rapid growth in the Australian coal industry of the past three decades has reflected a number of natural advantages, such as the close proximity of Australian mines to port facilities and to growing markets in Asia. The industry is now characterised by a large number of highly competitive and versatile producers who are responding to increasing pressures to reduce costs in the face of falls in the real world price of coal and associated low profits. Employment in the industry is falling.
In this context, the outlook for Australian coal supply is largely dependent on the effects of prices and exchange rates. This financial year, despite a significant fall in the world price of coal, Australian producers have been protected to some extent by an exchange rate depreciation. Even if the exchange rate begins to appreciate (as ABARE assumes) and US dollar prices continue to ease, Australian coal production may not fall substantially in the short term.

In the longer term, Australian production will be determined largely by the expectations of investors. In the past, announced plans for investment in Australian coal mining projects indicated that significant growth in Australian production is possible. However, increasing uncertainty has meant that many of these projects have been put on hold. As a result, it is expected that unless US dollar price rises occur over the medium term that are sufficiently large to offset a rising Australian dollar, investment in new projects will be adversely affected and, as a result, growth in Australian coal production may be slower than previously expected.

The international coal market shows a declining real price trend over the long term. In the main, this reflects declining marginal costs of production around the world. As a result the level of Australia’s future coal supply will also depend on its success in reducing its costs. Measures aimed at reducing rail freight costs and improving productivity have been undertaken but there is a long way to go.

On the challenge of improving productivity in mining, there appears to be a variety of possible approaches to success. These include international benchmarking, contract mining and industrial arbitration to resolve disputes. It is likely that significant progress will continue to be made in all these areas and that the Australian industry will continue to be able to meet the Asian supply challenge over the medium term.
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