The Wallarah 2 Coal Project

Economic assessment

By:

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Ref No. 249/08

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Economic assessment

Prepared by: **The Central Coast Research Foundation**
December 2008

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Executive Summary

Introduction

This document identifies the expected economic impacts from the proposed development of an underground coal mine in the Wyong Shire. The proposed mine is known as the Wallarah 2 Coal Project and its location is north of Wyong, primarily on the western side of the Sydney-Newcastle F3 Freeway in the Yarramalong, Little Jilliby and Dooralong valleys. The Tooheys Road site is on an adjoining site on the eastern side of the F3 Freeway.

If the proposal proceeds, construction is expected to require three years starting after the granting of development consent. The mine is expected to start operations after the three year construction phase with an estimated initial output of 0.3 million tonnes per annum. This output will rise to an estimated 4.5 million tonnes per annum by the fifth year of mining.

Unless otherwise specified, the only economic impacts identified in this report are those that have been estimated to flow to the Central Coast economy.

Method

Using the Hunter Valley Research Foundation's (HVRF) Input-Output (I-O) model, economic impacts were estimated in terms of the value of goods and services (output) and the number of jobs created on the Central Coast as a consequence of the economic stimulus provided by the project. *In I-O analysis, a job is defined as lasting for one year and being full-time.*

The multipliers derived from the I-O model enable the estimation of output and employment. However, these multipliers take account of leakages from the Central Coast. The higher the leakage, the lower will be the total economic impact of the project on the Central Coast (that is, the lower will be the output and employment generated on the Central Coast). Examples of how the impact could 'leak' outside of the Central Coast are:

- Services and materials required for the construction and operation of the mine may be sourced from outside the Central Coast
- Local suppliers may not source their required raw materials, equipment, components, services etc. from within the Central Coast.

Due to leakages, the size of the multipliers used in this report may appear lower than used in similar analyses. For example, a report prepared for the Minerals Ministerial Advisory Council estimated that an increase of 20,000 jobs in the mining sector would create an additional 90,000 jobs elsewhere in the economy of NSW.[1] These employment figures infer a multiplier of 4.5. However, due to leakages, the employment multipliers applied to the Central Coast in this report were significantly more conservative.

⊙ Data source and base year

The analysis was based on 2007/08 budget figures provided by the Wallarah 2 Coal Project to the Central Coast Research Foundation (CCRF). These budget figures remained unchanged as at 2007/08 when the report was revised by the CCRF. The value of the outputs expressed in this report are in 2007/08 dollars (i.e. base year=2007/08).

⊙ Results

Constructing the Wallarah 2 Coal Project

- The pattern of expenditures required to develop the Wallarah 2 Coal Project is shown in Table 1. The information also shows the estimated flow-on impacts that will result from the initial expenditures. Over three years, expenditures will be made into the sectors of *Machinery etc* ($270 million); *Construction* ($168 million); *Transport equipment* ($59 million); *Retail* ($26 million); and *Property and business services* ($20 million). The total initial expenditures are estimated to be $613.5 million over the construction phase.

- The total impact on the Central Coast economy from the three years of the mine's construction is expected to be approximately $1,058 million.

Table 1 Estimated output impacts from the construction of the Wallarah 2 Coal Project

	Output impacts			
	Year 1 $m	**Year 2 $m**	**Year 3 $m**	**Total $m**
Initial	227.8	231.1	154.5	613.5
Production	89.5	74.2	43.1	206.8
Consumption	84.2	93.8	59.2	237.4
Total flow-on	173.8	168.0	102.4	444.2
TOTAL OUTPUT IMPACT	401.6	399.1	256.9	1,058

- The pattern of initial and flow-on employment estimated to be generated from the construction of the Wallarah 2 Coal Project is shown in Table 2. In total, an estimated 2,989 jobs are expected to be created on the Central Coast as a result of the mine's three year construction. *In I-O analysis, a job is defined as lasting for one year and being full-time.*

Table 2 Estimated employment impacts from the construction of the Wallarah 2 Coal Project

	Employment impacts (number of jobs)			
	Year 1	**Year 2**	**Year 3**	**Total**
Initial	1,001	1,188	801	2,989
Production	321	278	167	765
Consumption	486	542	342	1,371
Total flow-on	807	820	509	2,135
TOTAL OUTPUT IMPACT	1,808	2,007	1,309	5,125

Operating the Wallarah 2 Coal Project

- The pattern of *expected operational expenditures* was taken to be the *initial impact* from the operation of the proposed Wallarah 2 Coal Project. The total output impact, that is the total value of goods and services that are produced because of the operation of the Wallarah 2 Coal Project, will be directly dependent on the size of the mine's operational expenditures and will continue for as long as the operational expenditures continue. The output impacts include the 'pay packet effect' which is the rise in the level of demand in response to more consumer spending. This rise in demand causes an increase in the production of goods and services. The initial and flow-on output impacts are shown in Table 3.

Table 3 Estimated output impacts from the operation of the Wallarah 2 Coal Project

	Output impacts					
	Year 1 $m	**Year 2 $m**	**Year 3 $m**	**Year 4 $m**	**Year 5 $m**	**Ongoing average $m**
Initial	53.0	74.1	93.9	120.0	121.3	130.8
Production	15.1	19.5	25.9	32.3	33.0	35.0
Consumption	19.2	27.6	33.0	43.8	44.1	48.4
Total flow-on	34.2	47.1	58.8	76.1	77.1	83.4
TOTAL OUTPUT IMPACT	**87.2**	**121.2**	**152.7**	**196.1**	**198.4**	**214.2**

- The pattern of expected employment from the Wallarah 2 Coal Project in the Central Coast is shown in Table 4. This table also shows the flow-on impacts that are anticipated from these expenditures. The flow-on impacts result from an increase in activity that is generated by the Wallarah 2 Coal Project. In its first year of operation the mine is expected to generate 428 jobs in the Central Coast economy which will rise to 726 jobs

by its sixth year. *In I-O analysis, a job is defined as lasting for one year and being full-time.*

Table 4 Estimated employment impacts from the operation of the Wallarah 2 Coal Project

	Employment impacts					
	Year 1 Jobs	**Year 2 Jobs**	**Year 3 Jobs**	**Year 4 Jobs**	**Year 5 Jobs**	**Average ongoing**
Initial	250	300	300	300	300	300
Production	67	87	111	136	138	147
Consumption	111	159	190	253	255	280
Total flow-on	178	247	301	389	393	426
TOTAL JOB IMPACT	**428**	**547**	**601**	**689**	**693**	**726**

Additional economic benefits

- In return for the right to extract minerals, royalties will be paid by the Wallarah 2 Coal Project to the NSW Government. The expected value of these royalties was estimated by the Wallarah 2 Coal Project to start at $1.4m per annum in its first year of operation and reach $20m when production plateaus in year five.

- The development of the Tooheys Road site will include the provision of power, water and other utilities. The current availability of these services close to this site is poor.[2] As the Wallarah 2 Coal Project will be underwriting the initial cost of provision, the initial connection cost of these services for firms locating near the site will be reduced. This could also provide a financial incentive for industries which support mining operations to locate in the area.[2]

- Some of the economic impacts generated by the *operation* of the Wallarah 2 Coal Project are expected to spill over into the neighbouring Hunter Region. This will result from the closeness of the proposed mine site to the boundary with the Hunter Region, and the Hunter's historical association with coal mining. Specifically, it is expected that demand for some services available in the Hunter Region, such as specialised engineering, will be created by the operation of the proposed mine. The additional employment benefits which are estimated to accrue to the Hunter Region from the Wallarah 2 Coal Project are shown in Table 5.

Table 5 Hunter Region employment impacts from the operation of the Wallarah 2 Coal Project

	Employment impacts (number of jobs)					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Ongoing average**
Initial	0	0	0	0	0	
Production	13	37	57	83	85	363
Consumption	89	145	173	239	241	248
Total flow-on	102	182	230	322	326	336
TOTAL JOB IMPACT	**102**	**182**	**230**	**322**	**326**	**336**

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1 Introduction

1.1 Background to this report

This document identifies the expected economic impacts from the proposed development of an underground coal mine in the Wyong Shire. The proposed mine is known as the Wallarah 2 Coal Project and its location is north of Wyong, primarily on the western side of the Sydney-Newcastle F3 Freeway in the Yarramalong, Little Jilliby and Dooralong valleys. The Tooheys Road site is similarly located but on the eastern side of the F3 Freeway.

Information on the proposed development was sourced from the:

- The document: *Wallarah 2 Coal Project – Preliminary Assessment*
- Subsequent reports prepared for the *Strategic Inquiry into Potential Coal Mining Impacts in the Wyong LGA*
- Data provided by the proponent to the Central Coast Research Foundation (CCRF).

The primary product from the mine will be export quality thermal coal. Initial investigations indicate that the coal will be low in moisture, sulphur and nitrogen and high in energy. It is believed that the coal will be sought for local and overseas power stations.

The assessment in this report was undertaken by the CCRF.

1.2 Basis of the economic assessment in this report

The basis of the economic assessment in this report was a model of the Hunter Region economy constructed by the Hunter Valley Research Foundation (HVRF). The model is based on Input-Output (I-O) techniques. The model and its appropriateness for use in assessing the Wallarah 2 Coal Project is discussed in Section 4.2.

I-O modelling measures the economic change which is caused by an injection or withdrawal of activity that has consequences for a community. The construction of a new port facility is an example of an injection into an economy because its construction expenditure of, say, hundreds of millions of dollars, will generate demand for labour and resources, which will be combined to form the new port facility. A withdrawal of activity from an economy creates a negative impact. A manufacturer closing operations is an example of the withdrawal of an activity that has economic consequences for a community.

I-O modelling will estimate the increase or decrease in the value of goods and services and the level of employment that is associated with either an injection or withdrawal of activity. However, I-O modelling does not capture externalities which may result from these changes in economic activity. Externalities are effects, positive and negative, from an activity that are not valued by the

market. For example, if the new port required mangroves to be cleared, the analysis would not capture the impact this clearing might have on local fisheries.

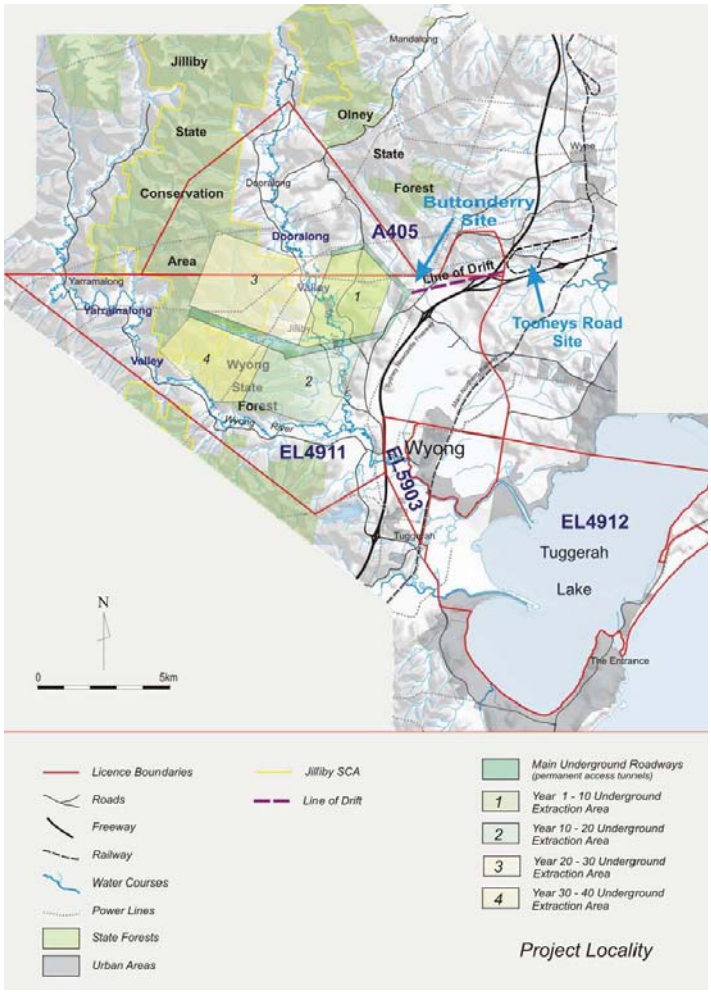
1.3 Outline of the content of this report

Section 2 identifies the key aspects of the Wallarah 2 Coal Project proposal. Although the mine will be located on the Central Coast, it will be close to the border of the neighbouring Hunter Region. For this reason, Section 3 provides a description of both economies, although the focus is on the Central Coast. An explanation of I-O modelling, including a discussion of multipliers and leakages, are included in Section 4. The results of the I-O analysis and other identifiable economic benefits are presented in Section 5.

2 The project

The Wallarah 2 Coal Project is a proposed underground longwall mine located north of Wyong, primarily on the western side of the Sydney-Newcastle F3 Freeway in the Yarramalong, Little Jilliby and Dooralong valleys. The proposed Tooheys Road site is similarly located but on the eastern side of the F3 Freeway. The location of the proposed mine is shown in Figure 2.1. This map was sourced from the Wallarah 2 Coal Project website.[3]

Figure 2.1 Location map of the proposed Wallarah 2 Coal Project



The product from the mine will be export quality thermal coal. Initial investigations indicate that the coal will be low in moisture, sulphur and nitrogen and high in energy. It is believed that the coal will be sought for local and overseas power stations. In addition to the longwall mining operation, the project will include coal handling and storage facilities, rail infrastructure and ventilation shafts.[3] Longwall mining is a technique for extracting underground coal. Its use for the Wallarah 2 Coal Project is due to the coal resource being located between 35 and 650 metres below the surface.[3]

3 The local economy

3.1 Overview of this section

The proposed Wallarah 2 Coal Project is to be located on the Central Coast, close to the alignment with the neighbouring Hunter Region. This section primarily focuses on the Central Coast economy where a substantial proportion of the benefits created by the spending associated with Wallarah 2 Coal Project are expected to be captured.

The Central Coast is located immediately north of Greater Sydney. Starting at Patonga and stretching north to Gwandalan and Doyalson, it includes the major urban centres of Wyong and Gosford. The Hunter Region is located immediately north of the Central Coast and, starting with the Lake Macquarie local government area (LGA), it stretches north to the Great Lakes LGA and westward to the Upper Hunter Shire.

This section provides an overview of the Central Coast economy and information on selected indicators of the labour force, business conditions and household consumption. Due to the proximity of the proposed mine to the neighbouring Hunter Region, a short summary of the Hunter's economy is also included.

3.1.1 Overview of the Central Coast economy

The Central Coast economy was historically based on agriculture and tourism but, helped by the development of the Sydney-Newcastle Freeway (F3 Freeway), the breadth of development has been increasing. Although, in terms of value, *Manufacturing* was, in 2001, the largest economic sector on the Central Coast, there is a diverse mix of industry sectors, many of which reflect the available natural resources.

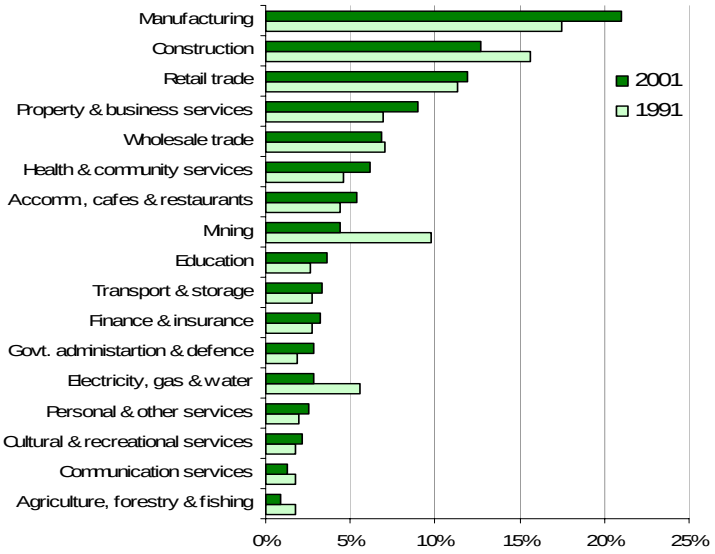
The natural resources of the Central Coast include mineral deposits and also the coastline and agricultural lands. The coastline and coastal lakes have supported substantial tourist developments, from major resort complexes to owner operated bed and breakfast establishments. Local industries have also developed around agriculture and mining, as have firms in the manufacturing and services sectors.

The development of the F3 freeway, amongst other factors, assisted population growth on the Central Coast. The local amenity of the area, particularly its coastal setting, attracted many new residents. However, this population growth has been greater than the rate of local employment growth. The Draft Central Coast Regional Strategy (2006) indicated that about one-quarter of employed persons who live on the Central Coast commuted outside the region for work, with most travelling to Sydney.[4] The Strategy suggested that the ability of the Central Coast to be self contained, in terms of providing employment opportunities for residents, is likely to be weakened further as population growth outstrips the increase in local jobs. If correct, the proportion of employed persons commuting to employment centres outside the Central Coast is likely to rise.

The proportion of Central Coast residents working in neighbouring regions has both positive and negative consequences. The incomes earned elsewhere are likely to generate additional spending on the Central Coast and, if they do, they will provide an injection into the local economy which will ultimately assist the growth of local jobs. However, this impact will be diminished if the income earned outside the Coast is spent in the neighbouring regions, for example, in centres which are close to the place of work. The amount of time commuters spend travelling can have negative consequences on work-life balances as well as making this commuter group vulnerable to rising fuel and transport costs. Overall, there is more advantage in having employment opportunities within reasonable travelling times of where people live. For this reason, the creation of local jobs is seen as a regional challenge for the Central Coast.[4]

Estimates of gross regional product allow a comparison to be made of the size of sectors within a local economy and have, for 1991 and 2001, been published by National Economics and the Local Government Association.[5] The Central Coast economy has a large *Manufacturing* sector, as shown in Figure 3.1. Over the ten years between 1991 and 2001 the size of this sector increased to represent more than one-fifth of the total economy. In terms of proportional size, *Construction* and *Retail trade* are also large sectors, despite the proportional fall in the value of the *Construction* sector between 1991 and 2001. Over this ten year period the absolute size of most sectors of the Central Coast economy grew. However, in terms of proportional size several sectors had a smaller representation in the economy in 2001 than they did in 1991. The largest proportional decline was in *Mining*, falling from 9.8 per cent of the economy in 1991 to 4.4 per cent in 2001.

Figure 3.1 Proportion of gross regional product by sector, Central Coast, 1991 and 2001

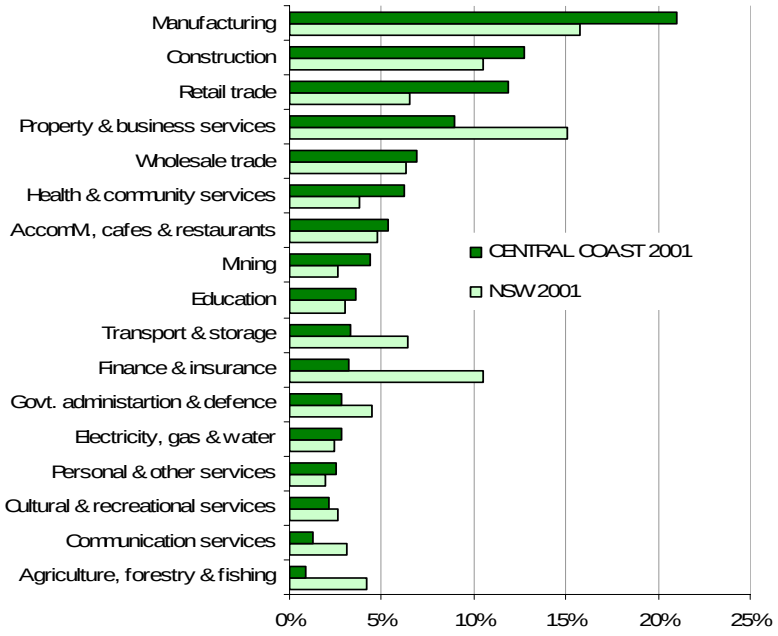


Source: State of the Regions 2003, National Economics and Local Government Assoc.

Comparing the proportional representation of each economic sector for the Central Coast and NSW identifies some important differences (see Figure 3.2). *Manufacturing* represents a larger

proportion of the Central Coast economy than in NSW overall. Sectors that are related to consumer spending such as *Retail trade* and *Construction* represent a substantially larger proportion of the Central Coast economy than the State average. On the Central Coast some sectors providing services, like *Finance and insurance* and *Property and business services,* are relatively smaller than the State average. Despite the historical association between the Central Coast and agricultural activities, the proportional size of *Agriculture, forestry and fishing* is substantially smaller than the State average.

Figure 3.2 Proportion of gross regional product by sector, Central Coast and NSW, 2001



Source: State of the Regions 2003, National Economics and Local Government Assoc.

As shown below, evidence from unemployment rates, business profitability, consumer confidence and new housing approvals suggest the Central Coast economy is currently experiencing subdued levels of activity which, for some indicators, started in early 2003. Slowing international and national economies is expected to exacerbate the weak conditions on the Central Coast.

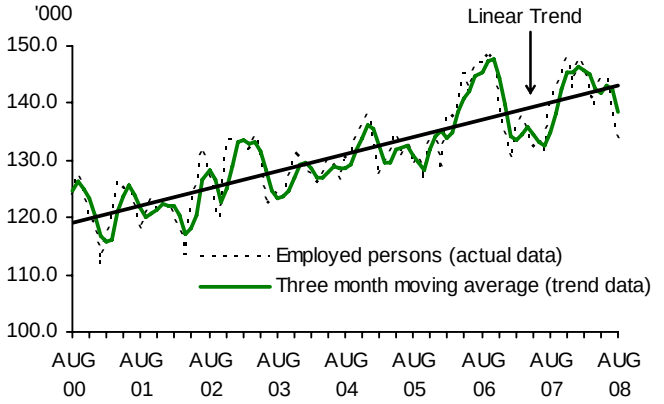
3.1.2 The Central Coast labour force

Employment indicators are often used to identify economic cycles, particularly when regular time series data for estimated gross regional product are not available. As shown in Figure 3.3, the long-term trend in the number of people in employment has been rising since 2000 and this growth suggests that the local economy has been expanding. The long-term linear trend shown in this figure is one method of determining when employment levels have been *above* or *below* the long-term average – currently employment levels are below the long-term average.

The Central Coast labour force figures are also influenced by employment opportunities in surrounding urban centres such as Sydney and Newcastle. Central Coast residents who commute to these neighbouring areas for work are recorded in the Central Coast employment figures.

Therefore, rising employment on its own is not necessarily reflective of the health of the Central Coast economy.

Figure 3.3 Number of people employed, Central Coast

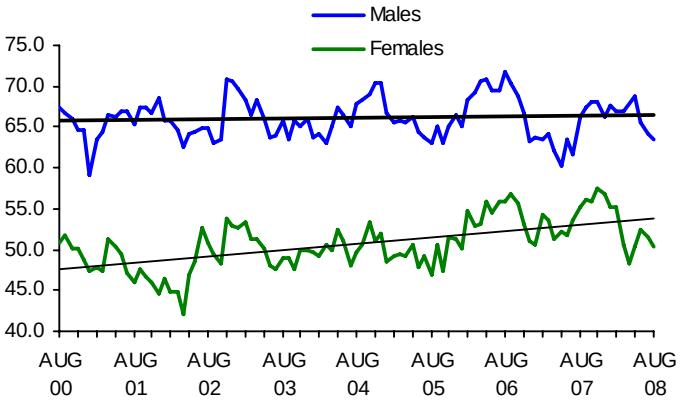


SOURCE: Australian Bureau of Statistics, Monthly Labour Force Survey

Figure 3.4 shows participation rates on the Central Coast. These rates reflect the proportion of people in the working age range who are in the labour force (i.e. either employed or seeking work) as a proportion of the total number of people in this age range. Reflecting national figures, female participation rates are lower than those recorded for males, but the increase in the Central Coast's female participation rates has been faster than the rates for males – which have been relatively flat since 2000. The differing rates of increase between male and female participation have resulted in a narrowing gap between the two.

One of the drivers associated of participation rates is the likelihood of finding work. Participation tends to rise when people feel there is a reasonable chance of finding employment. As this likelihood improves, people who would have otherwise not been encouraged to search for work (i.e. not in the labour force) tend to initiate job seeking behaviour. Financial necessity can also encourage those who would otherwise not be in the workforce to seek employment. The rising cost of living (as measured by the consumer price index), recently high fuel prices and the last round of interest rate increases would have contributed to a greater financial need for many households to have an additional income stream – perhaps partially explaining the increase in the female participation rate.

Figure 3.4 Participation rates, Central Coast

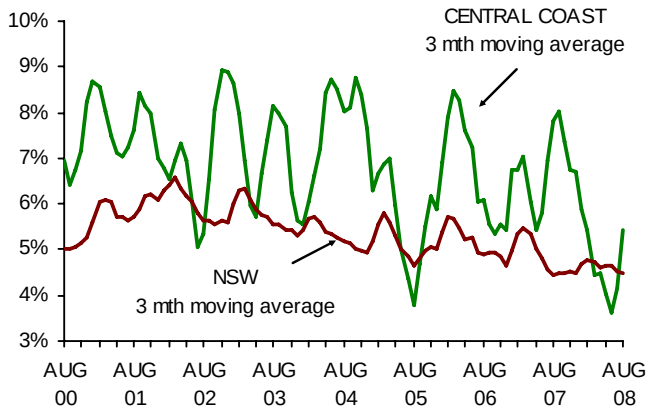


SOURCE: Australian Bureau of Statistics, Monthly Labour Force Survey

The data for participation rates and employment are both indicative of a positive economic climate for the Central Coast. However, other non-labour force indicators (discussed below) suggest that economic activity is weak relative to earlier years.

Evidence of the susceptibility of the Central Coast to economic cycles is found in unemployment data. As shown in Figure 3.5, the volatility in the Central Coast's unemployment rate suggests changed economic circumstances can have substantial impacts on the labour market. Part of this volatility can be explained by the sample data from which the unemployment rates are estimated. Variation in this unadjusted data contributes to large swings in the unemployment rate between months. However, examination of the time series based on three month averages (shown in chart) shows periods when the average Central Coast unemployment rate was substantially higher than the State rate. The tendency for these rates to stay above the State figures suggests an inherent volatility in the local labour force. As shown in Figure 3.5, high unemployment rates have tended to characterise the Central Coast since 2000. In early 2008, the unemployment rate temporarily moved under the NSW rate, but it is now higher the NSW rate and its direction is upward. Current financial and economic conditions suggest that unemployment rates nationally and for the Central Coast will edge upwards.

Figure 3.5 Unemployment rates, Central Coast and NSW



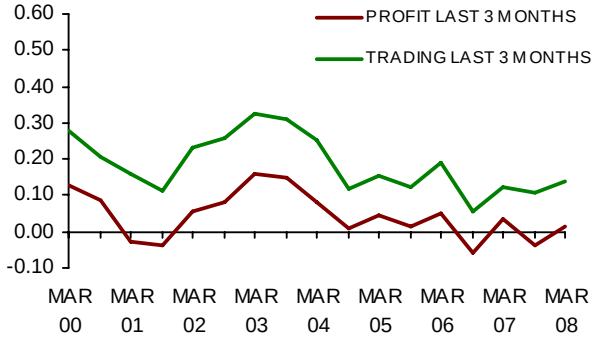
SOURCE: Australian Bureau of Statistics, Monthly Labour Force Survey

3.1.3 Central Coast business indicators

Two key indicators of business activity are the levels of trading and profitability. Compared with unprofitable firms, profitable establishments are in a better position to invest in plant and equipment, and to develop innovative products and introduce technological advances into production techniques. Extended periods of poor profitability will reduce investment in the capital equipment and technology that keep businesses competitive.

A twice yearly survey conducted by the CCRF[6] monitors a series of business indicators. Profitability and trading are two of these indicators and the results since 2000 are shown in Figure 3.6.

Figure 3.6 Trading and profitability over the previous three months, Central Coast

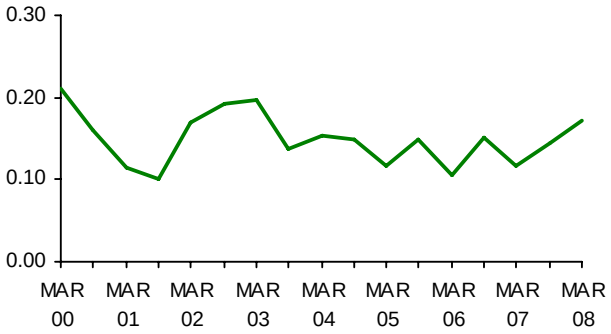


SOURCE: CCRF business confidence surveys

As suggested by data on unemployment rates, the Central Coast economy tends to be prone to volatility and this is reflected in cycles of trading and profitability. In recent years Central Coast firms have been recording weak levels of trading and profitability.

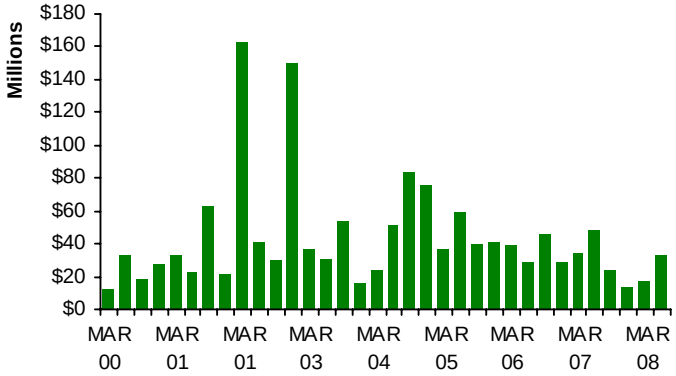
Despite the recent weakness in trading and profitability, there has not yet been a clear impact on the reported intentions of local firms to invest in plant and equipment. As shown in Figure 3.7, businesses' expectations for capital expenditure have recently been stable although lower than recorded in early 2000. The most recent figures show rising intentions to invest in capital equipment over the next 12 months. In Figure 3.7 higher values of the index represent an increased likelihood of capital spending over the next 12 months. However, the evidence for rising business investment is weak. The real value of non-residential building approvals (see Figure 3.8), which are also an indicator of business investment, have been showing a tendency to decline since peak at the end of 2004.

Figure 3.7 Planned capital expenditure over the next twelve months, Central Coast



SOURCE: CCRF business confidence surveys

Figure 3.8 Real value of non-residential building approvals, Central Coast



Base year 1998/99

SOURCE: Australian Bureau of Statistics, Catalogue Nos 8731.1, 6427.0

3.1.4 Central Coast consumption indicators

Given the relative importance of *Retail trade* and *Construction* to the Central Coast economy, the activity of local consumers can have significant impacts on the direction of economic activity. Two important consumer indicators are the level of:

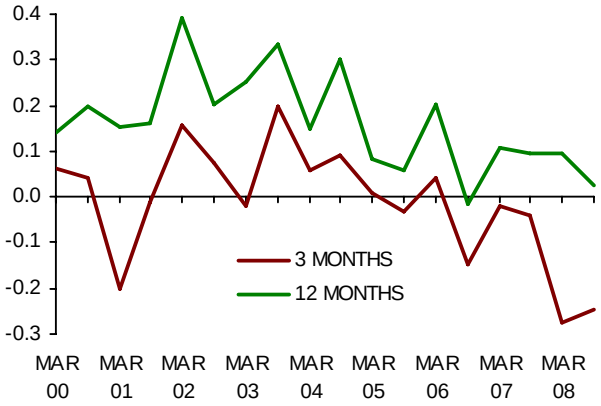
- Confidence consumers have in the local economy

- Residential building approvals.

The level of consumer confidence is important because it can influence the direction of consumer spending; less confident consumers are more likely to be conservative spenders. Residential building approvals are both an indicator of household consumption (of new housing) and a leading indicator of activity in the *Construction* sector.

Consumer confidence in the local economy has been weakening over recent years (see Figure 3.9). The implication from this movement is that local consumers are likely to be more conservative in their spending behaviour. This trend in consumer confidence corresponds with declining numbers of new housing approvals. International economic conditions and forecasts of deteriorating conditions in Australia over 2009 are likely to further constrain consumer confidence and consumer spending.

Figure 3.9 Consumer expectations for the Central Coast economy



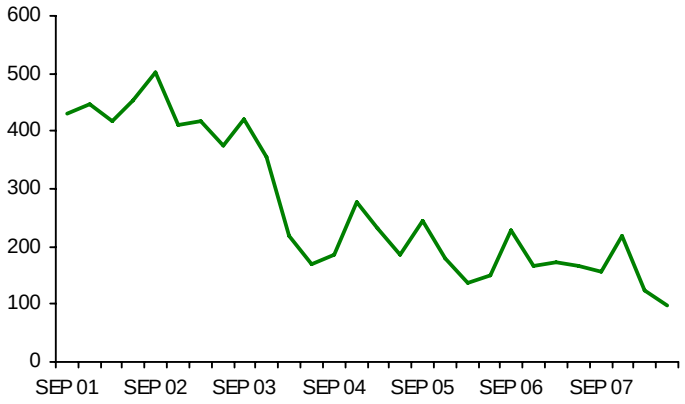
SOURCE: CCRF household surveys

As shown in Figure 3.10 the trend in building approvals has been weakening in recent quarters. This low level of activity is partly attributable to declining residential house prices and increasing interest rates (up to September 2008). The figures suggest Central Coast residents and developers are not initiating plans to build new homes or add to existing dwellings in an environment where equity in existing housing is being eroded and the return on investment in the housing sector is unattractive. The Central Coast median house price is lower than most parts of Sydney, making the Region a more affordable location for residents. However, the relatively limited opportunity for employment on the Central Coast is a countervailing influence which is limiting demand.

The Central Coast economy is particularly vulnerable to downturns in discretionary consumer spending because retail trade employs the highest proportion of Central Coast residents. Recent initiatives such as family and pensioner payments announced by the Federal Government may

revive spending during the Christmas period, but this will at best provide a short-term reprieve from what are longer-term trends on the Central Coast.

Figure 3.10 Number of residential building approvals, Central Coast



SOURCE: Australian Bureau of Statistics, Catalogue Nos 8731.1, 6427.0

3.1.5 Concluding remarks on the Central Coast economy

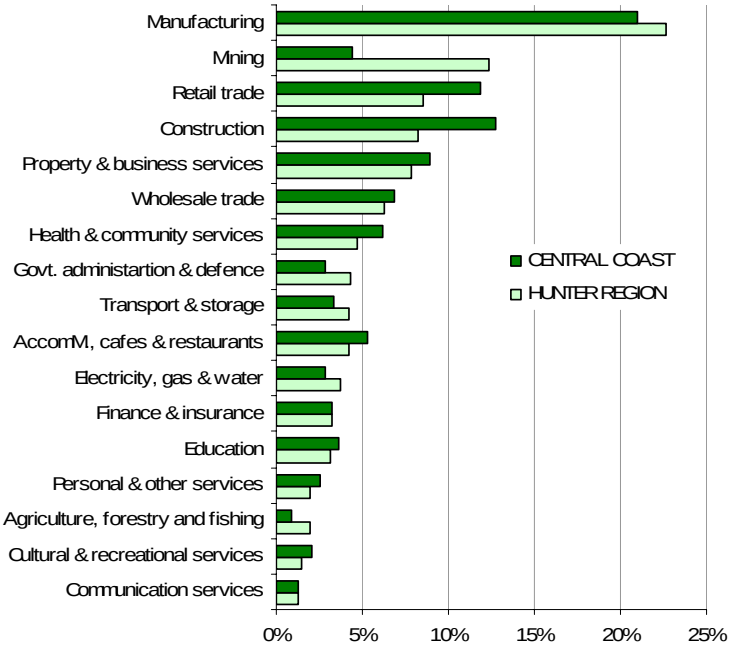
The benefit of having a diversified economy, as the Central Coast does, is that it has the potential to offer a degree of stability when individual sectors are in decline. However, despite having this diversity current economic activity is weak relative to what has been experienced on the Coast in recent years. The selected indicators discussed in the previous sections show that there is volatility in the Central Coast economy - and this is reflected by unemployment rates that are generally higher than the State average. The current economic uncertainty affecting Australia is likely to exacerbate conditions on the Central Coast – it is anticipated that unemployment will rise on the Central Coast over 2009.

A characteristic of the Central Coast economy is that a substantial proportion of its residents travel to neighbouring regions for work.[4] The recently released Draft Central Coast Strategy[4] has identified the creation of local jobs as a regional challenge. The benefit of local employment opportunities will be a reduction of travelling times (and associated costs) for those commuting long distances to work. There will also be a greater likelihood that income earned locally will be spent locally, that is, leakage to neighbouring economies will be reduced.

3.1.6 The Hunter Region economy

Like the Central Coast, the Hunter Region economy has a large *Manufacturing* sector, as shown by the share this sector has of estimated total gross regional product (see Figure 3.11). Unlike the Central Coast, the Hunter Region has a large and established *Mining* sector, which is mainly involved in the extraction of coal. While *Retail trade* and *Construction* are large sectors in the Hunter Region, proportionally these sectors have a larger share in the Central Coast economy.

Figure 3.11 Proportional share of estimated regional gross product, Central Coast and Hunter Region



Source: State of the Regions 2003, National Economics and Local Government Assoc.

The Hunter Region economy has been undergoing long-term structural change for several decades. Proportionally, employment has been shifting away from heavy manufacturing towards more employment in the tertiary sector. This structural change has been partially reflected in unemployment rates that, similar to the Central Coast, have tended to be above those recorded for the State overall. Like the Central Coast, unemployment rates are quite volatile in the Hunter Region and this represents the ability of periods of weak economic performance to have substantial impacts on the regional economy.

Most recently, economic activity in the Hunter Region has been weakening – in line with conditions at the state and national levels. New housing, which is an important driver of economic activity, remains weak (up to June 2008). Indicators of consumer confidence and business activity in the Hunter Region have also been faltering despite the Hunter's labour force remaining relatively strong (low unemployment and rising employment).[7]

The economies of the Hunter Region and Central Coast, while close, do not always follow the same cycles. However, recent indicators of business and household activity for both regions show that both are currently in a similar phase of the business cycle.[6, 7]

4 Background to the Input-Output analysis

4.1 Input-Output models

An Input-Output (I-O) model provides a descriptive snapshot of a particular economy at a point in time. Assessments using I-O models estimate the 'economic impact' of a change in economic activity caused by either an increase or decline in spending associated with a specific industry. The results of the analysis are shown in terms of the value of the goods and services which are generated (which will be more than the initial increase or decline in spending) and the number of jobs which are created.

I-O modelling assumes that each industry in an economy is related to every other industry. The relationship is strong between some industries (e.g. coal and transport are closely related) and weak between others (e.g. coal and communications tends to have a weaker relationship). The strength of the relationship between all industries is represented by multipliers.

The multiplier represents the aggregate impact of a change in expenditure. That is, the impacts that are additional to the 'initial' impact (called flow-on impacts) are captured by the value of the multiplier.

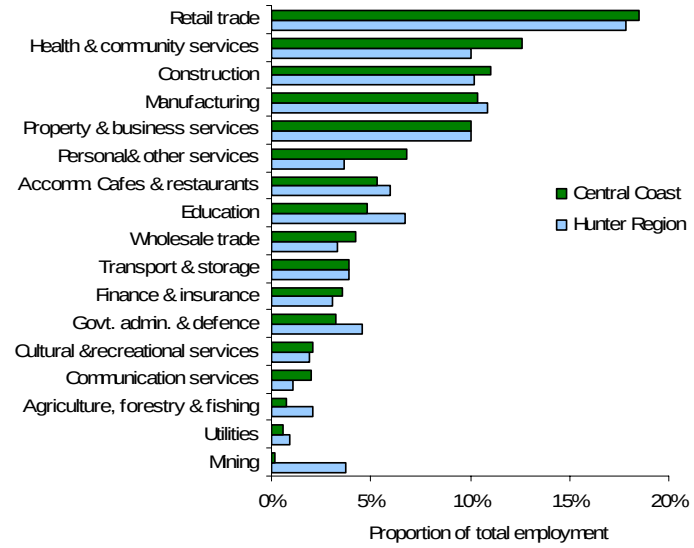
The I-O model used in this report is one developed for the Hunter Region economy. The model was developed by the Hunter Valley Research Foundation (HVRF) and comprises 29 sectors. The data which was used for the model was compiled from a survey of over 300 organisations in the Hunter Region in 2001. The Hunter Region is as defined by the Australian Bureau of Statistics (ABS) in 2001. Note, recently the ABS redefined the Hunter Region with the amalgamation of several Upper Hunter Local Governments Areas (LGA) while some sections of these LGAs were transferred to adjoining regions.

4.2 Applicability of the Hunter Region I-O model for the Central Coast

In terms of the Wallarah 2 Coal Project development, the HVRF I-O model includes the Lake Macquarie LGA but not the Central Coast LGAs of Wyong and Gosford.

It is argued that the use of the Hunter Region I-O model for developments in nearby areas, but technically outside of the Hunter Region, is appropriate. This argument is based on the similarities in the structure of the Central Coast and Hunter Region economies. The Central Coast is immediately adjacent to the Hunter Region and, to a reasonable extent, the labour force distribution between the two regions is similar (see Figure 4.1). Furthermore, as shown in Figure 3.11, the relative size of most sectors in each economy was similar. However, it is noted that the *Mining* sector represented a substantially larger proportion of the Hunter's economy. This is not considered to be problematic for the analysis because multipliers represent the strength of linkages between sectors and this is not necessarily related to a sector's size.

Figure 4.1 Proportional representation of employment by sector, Central Coast and Hunter Region



SOURCE: Australian Bureau of Statistics

Of potential significance to the analysis is the low likelihood that the Central Coast has a comparable level of industries which support *Mining*. The historical association the Hunter Region has had with coal mining has encouraged the concurrent development of specialist support industries (e.g. engineering and transport). It is unlikely that these services will be as prevalent on the Central Coast. However, the difficulty this issue presented was substantially overcome by the provision of detailed cost estimates by the Wallarah 2 Coal Project. The costing estimates identified the major expenditure items during construction and operation and, importantly, identified those that would not be sourced from the Central Coast. These items included specialist consulting services and specialised machinery. These items were excluded from the I-O analysis.

4.3 Using Input-Output models

I-O analysis essentially identifies and evaluates linkages between sectors in the economy. The analysis uses the expenditure by a firm on its final product as a starting point, and then tracks backward through the various sectors in the economy to identify the contribution each sector makes to that final product. As the connections are traced backwards, the analysis is made in terms of the:

(a) Initial impacts of the expenditure, and the

(b) Flow-on impacts.

The I-O model allows the impacts of the operation of a particular industry to be measured in each specific sector of the economy. The "impacts" are defined as the generation of output and employment.

The use of I-O analysis makes it possible to estimate the value of all the goods and services, and the level of employment, required to produce a certain amount of output in a specific industry. The analysis also yields the value of the goods and services, and the level of employment, which results from the expenditure of salaries earned due to that production.

Taking the value of the final product (the construction and fulfilment of the contract) as a starting point, the model makes it possible to trace back through the sectors contributing to the production of that final product and apportion its value amongst those various sectors. The sectors used in the HVRF I-O model are defined in Appendix 1.

4.4 Analysing the economic impacts from the Wallarah 2 Coal Project

The total economic impact of the production of a final product by an organisation is identified according to its initial impacts and flow-on impacts. These impacts are measured in terms of the value of output generated and the number of jobs created, in total and in each sector of the economy. *In I-O modelling, a job is defined as a full-time position which lasts for one year.*

There are two stages of the project to be analysed.

- Firstly, the construction and preparation work that would ultimately enable the mine be productive. During the period of construction and preparation, the initial output impacts are measured by the value of revenue secured by the industries involved in this phase of the project. The initial employment impacts represent the number of people employed during construction and preparation.

- Secondly, the operational stage of the mine. In this stage, the initial output impacts are usually measured by the value of coal produced. However, as the Wallarah 2 Coal Project was able to provide detailed operational expenditures, these were used instead of a single estimate of the value of coal produced. These detailed expenditures allow for a more accurate analysis. The number of people estimated to be employed directly by the Wallarah 2 Coal Project is the 'initial impact'. The flow-on output and employment impacts will occur as a result of these initial values for expenditure and employment at the mine.

In conceptual terms, initial impacts can be thought of as the cause, and flow-ons as the effects. The total economic impact is the sum of the cause and effect components, quantified using I-O analysis in terms of the value of all goods and services produced and the amount of employment generated in the regional economy.

4.5 Multipliers

Calculation of the flow-on effects specified above is made by the application of a set of factors called multipliers which are generated by the I-O model. A multiplier is essentially a measurement of the magnitude of response to an economic stimulus.

In the I-O literature multiplier impacts are sometimes defined differently and/or a particular multiplier effect may be referred to by different names. The CCRF has adopted the following conventions to describe and quantify multiplier impacts, which formalise the preceding explanation of flow-on effects.

Production-induced multiplier impacts

The increase in the production of goods and services and employment which occurs in response to (a) the initial construction expenditure and (b) the initial value of expenditures needed to operate the mine. This multiplier takes into account the effect of purchases by a firm from the sector in which it is classified in the I-O model, as well as the effects in all other sectors of the model, arising from transactions between sectors as successive waves of increases in production occur.

Consumption-induced multiplier impacts

The output and employment effects arising from the increase in household incomes (wages, salaries, dividends and profits) in all sectors of the economy as a result of the (a) the initial construction expenditure and (b) the initial value of expenditures needed to operate the mine. The main influence captured here is the stimulation to the retail and service sectors when householders purchase consumer goods and services with their increased incomes. This effect is sometimes referred to as the `pay-packet' effect.

Total flow-on impacts

The joint effect of the production-induced and consumption induced impacts.

Total impacts

The sum of the initial impacts and the production and consumption induced flow-on impacts. That is, the sum of the cause and effect components.

4.6 Some caveats about the results of input-output analysis

Given all assumptions implicit in the I-O model, the multiplier effects (which have been calculated and presented in the following section) represent the maximum impacts on the regional economy that would result from the proposed Wallarah 2 Coal Project. Factors which would act to reduce the extent of these impacts include:

- Time lags in response: it is assumed that the total output, income and employment responses occur in the same year in which they are initiated. Company policy decisions, changes in other areas of the economy and other institutional changes may influence the timing and the degree of the multiplier impacts.

- The static nature of I-O models: multiplier analysis is based upon an `economic snap-shot'. Changes in trade patterns, technological change, product substitution, price changes etc., all of which influence the structure of the economy, would influence the magnitude of the multiplier impacts. However, these variations generally have the greatest effect on sectoral multipliers, with total multipliers showing a reasonable degree of stability through time.

Other limitations of I-O analysis relate to:

- The aggregate nature of I-O models: the HVRF I-O model contains 29 industry sectors. Defining the economy in these terms necessarily embodies substantial aggregation. One consequence of this aggregation is that it is not possible to estimate economic impacts on specific firms within a particular industry sector.

- The assumption of unemployed resources: the analysis assumes that unemployed resources are available within the Central Coast to meet any increase in demand, and that the same proportion of inputs will be used to meet the increase.

- The non-inclusion of externalities: externalities exist where the consumption or production of a good or service impacts on the welfare of others and where the value of this impact is not reflected by the price mechanism.[8]

4.7 `Leakages' from the Central Coast

The flow-on impacts take into account `leakages' from the Central Coast economy: that is, expenditures which are made outside the Central Coast. The higher the leakages, the lower will be the total economic impacts of the project on the Central Coast (that is, the lower will be the output and employment generated on the Central Coast). The size of these leakages has been assumed to be similar to those recorded in the Hunter Region.

Expenditure associated with the Wallarah 2 Coal Project may be directed to local suppliers wherever possible, nonetheless it may escape from the Central Coast because:

- Services and materials required for the construction and operation of the mine may be sourced from outside the Central Coast

- Local suppliers may not source their required raw materials, equipment, components, services etc. from within the Central Coast

- Expenditure on the Central Coast does not necessarily imply manufacture on the Central Coast. Items purchased from the wholesale and retail trade sectors, for example, may have been imported from other regions in Australia or from overseas. Only the profit from the sale, or a proportion of the profit, will be retained in the Central Coast.

Due to leakages, the size of the multipliers used in this report may appear lower than used in similar analyses. For example, a report prepared for the Minerals Ministerial Advisory Council

estimated that an increase of 20,000 jobs in the mining sector would create an additional 90,000 jobs elsewhere in the economy of NSW.[1] These employment figures infer a multiplier of 4.5. However, due to leakages, the employment multipliers applied to the Central Coast in this report were significantly more conservative.

5 Economic impact analysis

5.1 The project and scope of analysis

The analysis in this document relates to a proposal by the Wallarah 2 Coal Project to develop and then operate a coal mine on the NSW Central Coast.

If the proposal is successful, the construction of the coal mine will commence following granting of development consent and take approximately three years to construct, after which time the mine will become operational. Once in production, output is expected to rise from an estimated 0.3 million tonnes of coal in the first year of production to 4.5 million tonnes by the fifth year of production and continue at this level for the life of the mine.

The economic analysis in this section was based on the Hunter Valley Research Foundation's (HVRF) Input-Output (I-O) model and used data supplied by the Wallarah 2 Coal Project. This data identified the likely expenditure patterns for the on-site construction that would be required to enable coal extraction from the site. The data also identified the likely pattern of direct employment and spending that would result from the mine's operation.

Construction and preparation works:

> To develop the site to enable the extraction of coal, the Wallarah 2 Coal Project estimates that on-site construction and preparation work would require initial expenditure of $613.5 million during the three year construction phase and that most of this amount would be initially spent within the local area. The construction expenditures were placed into the sector where they are planned to be spent. This enabled the I-O analysis to estimate the impacts using the unique set of multipliers which characterise each sector.

Operations:

> The extraction of coal from the mine (operations) is estimated by the Wallarah 2 Coal Project to start three years after construction commences at an initial output of 0.3 million tonnes and increase to 4.5 million tonnes by the fifth year of operation. This output is expected to be maintained over the remaining life of the mine. The Wallarah 2 Coal Project was able to provide detailed breakdowns of expenditures during the project's operation phase. Excluding expenses that were identified as flowing outside of the Central Coast, expenditures were placed into the respective sectors which enabled the I-O analysis to estimate the impacts using the unique set of multipliers which characterise each sector.
>
> The detailed operational expenditures allowed the employment impacts to be calculated in each sector of the economy. While the flow-on employment was calculated from this data, the expected initial employment at the mine was identified by the Wallarah 2 Coal Project.

There were two aspects of the operational data that required special treatment:

- **Government royalties from the mining operations were excluded from the I-O assessment.** However, they are documented in this report as an additional benefit from the Wallarah 2 Coal Project. The exclusion of these figures from the I-O analysis was because the payment of these royalties goes into government revenue. Unlike expenditures paid to other industries, in return for the direct production of goods or delivery of a specific service, there is no clear product or service that is produced *because* of the royalties. The expenditure of this money by the government will generate economic activity, but it is beyond the scope of this report to analyse the activity this revenue could generate.

- **Major overhauls during the life of the mine were included in the I-O assessment.** However, the Wallarah 2 Coal Project estimates that only 50 per cent of the work required by the overhauls would be undertaken by Central Coast firms. Therefore, the dollar value of the overhauls was reduced by this amount for the I-O analysis so that a focus was maintained on benefits that would accrue to the Central Coast economy. Major overhauls have been estimated by the Wallarah 2 Coal Project to require spending of approximately $33 million per annum, of which 50 per cent would be directed to Central Coast firms during the initial years. After this time, the proportion directed to Central Coast firms is expected to increase to 70 per cent. The basis of this estimate is the experience of management and advisors to the Wallarah 2 Coal Project. This experience includes:

    - The result of preliminary investigations into potential suppliers for components which require regular replacement such hydraulic hoses and fittings, conveyer specialists, generators, cabling, power transmission, fasteners, gearboxes, drive and bearings. The investigations identified potential Central Coast suppliers for each of these and other components.[2]

    - An understanding that the operation of coal mines requires the timely delivery of services. The operational aspects of coal mines require the availability of these services to be ‘on demand’ and ultimately this requires the close proximity of the support industries to the mine site. This might entail existing Central Coast firms expanding their range of services to meet the demands of the local mine, or firms that are located elsewhere opening branches and offices closer to the mine site.[2]

5.2 Results

The following sections identify the estimated impacts on the Central Coast's economy from the development and operation of the proposed Wallarah 2 Coal Project. The value of the outputs provided are expressed in 2007/08 dollars (i.e. base year=2007/08).

The analysis included:

1. The construction cost of site and other preparation works that would enable the extraction of coal at the Wallarah 2 Coal Project.

2. The operation of the mine, using the breakdown of expected expenditures provided to the CCRF by the Wallarah 2 Coal Project.

5.2.1 Economic impact of constructing the Wallarah 2 Coal Project - output impacts

- Development works will be required to prepare the mine. The preparations will require expenditures that will be made into various sectors of the regional economy over three years. The initial expenditure, and the estimated flow-on and total output impacts that result from the initial expenditure, are shown in Table 5-1.

- Over these years, the largest initial expenditures will be directed to the sectors of: *Machinery etc*. (270 million); *Construction* ($168 million); *Transport equipment* ($59 million); *Retail* ($26 million); and *Property and business services* ($20 million). The total initial expenditures are estimated to be $613 million over the three year construction period.

- As a result of these initial expenditures, flow-on impacts will be generated from the production and consumption induced impacts. Over the construction period these combined flow-on impacts are estimated to be $444 million.

- As a result of the construction and preparation works required to undertake the contract, the estimated total output impact on the Central Coast economy will be $1,058 million over the three year construction period.

Table 5-1 Estimated output impacts from the construction of the Wallarah 2 Coal Project

	Output impacts			
	Year 1 $m	**Year 2 $m**	**Year 3 $m**	**Total $m**
Initial	227.8	231.1	154.5	613.5
Production	89.5	74.2	43.1	206.8
Consumption	84.2	93.8	59.2	237.4
Total flow-on	173.8	168.0	102.4	444.2
TOTAL OUTPUT IMPACT	401.6	399.1	256.9	1,058

5.2.2 Economic impact of constructing the Wallarah 2 Coal Project - employment impacts

- As noted above, development works will be required to prepare the mine site for the extraction of coal. The preparations will require expenditures that will be made into various sectors of the regional economy over the three year period. These expenditures will generate initial employment in most sectors of the economy. *A job in I-O analysis is defined as being full-time and lasting for one year.*

- Initially, 2,989 jobs are expected to be created over the three years of construction. The estimated numbers of initial, flow-on jobs are shown in Table 5-2.

- The 2,989 initial jobs will be spread throughout the local economy including the sectors of: *Machinery, etc.* (1,526 jobs); *Construction* (513 jobs); *Transport equipment* (227 jobs); and *Accommodation cafes and restaurants* (189 jobs).

- As a result of this initial employment, flow-on employment impacts will be generated from the production and consumption induced impacts. Over the three years this combined flow-on is estimated to be 2,136 jobs.

- As a result of the construction and preparation works required to prepare the mine, the estimated total employment impact on the Central Coast economy over the three years of construction is estimated to be 5,125 jobs.

Table 5-2 Estimated employment impacts from the construction of the Wallarah 2 Coal Project

	Employment impacts			
	Year 1 Jobs	**Year 2 Jobs**	**Year 3 Jobs**	**Total Jobs**
Initial	1,001	1,188	801	2,989
Production	321	278	166	765
Consumption	486	542	342	1,371
Total flow-on	807	820	509	2,136
TOTAL OUTPUT IMPACT	1,808	2,007	1,309	5,125

5.2.3 Operation of the Wallarah 2 Coal Project – the initial impacts

- As shown in Table 5-3 the mine is planned to start production after the three year construction period and output will increase over a five year period from 0.3 million tonnes per annum reaching 4.5 million tonnes per annum and remaining at this level for the life of the mine.

- The analysis in the following sections provides estimates of the output and employment impacts during the initial years of operation, after which the costs of operating the mine are

expected to stabilise. The output and employment impacts will continue for as long as the mine's output remains at this level.

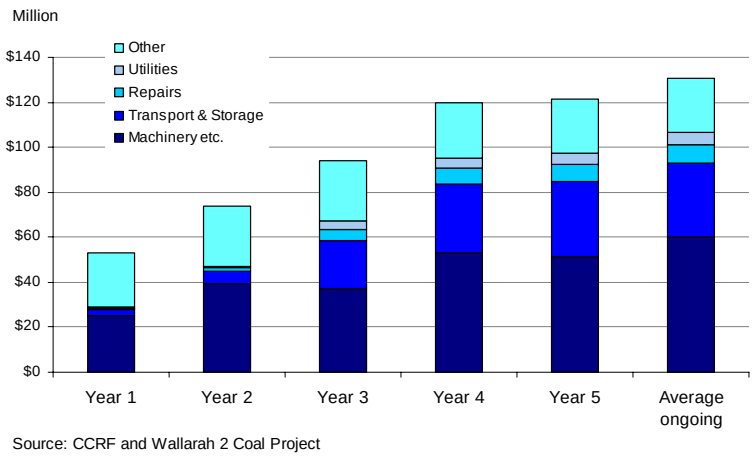
- The measurement of the impacts from operating the Wallarah 2 Coal Project is based on the planned operational expenditures over the first five years of operation and average expenditures thereafter. Often in I-O analysis the value of turnover from the firm being examined is taken as a proxy for the initial increase in economic value; this initial increase is then used to estimate flow-on expenditures. This is the usual practice because detailed operational expenditures are rarely available. However, these detailed have been provided by the Wallarah 2 Coal Project and they have been used in the following analysis. Using these expenditures provides a more conservative estimate of the output and employment impacts because, over the life of the mine, the sum of these operational expenditures will be less than the sum of expected turnover.

Table 5-3 Estimated operational expenditures from the operation of the Wallarah 2 Coal Project

	Expenditures					
	Year 1 $m	**Year 2 $m**	**Year 3 $m**	**Year 4 $m**	**Year 5 $m**	**Average ongoing $m**
Initial impacts	53.0	74.1	93.9	120.0	121.3	130.8

- Over the first six years of operation, the expenditures will occur in most sectors of the economy with the largest amounts going to *Machinery etc*., *Transport and storage,* and *Repairs*. The pattern of the initial expenditures is shown in Figure 5.1.

Figure 5.1 Estimated operational expenditures (initial impacts) for the Wallarah 2 Coal Project



Source: CCRF and Wallarah 2 Coal Project

5.2.4 Operation of the Wallarah 2 Coal Project - output impacts

- Coal production from the Wallarah 2 Coal Project is expected to start after the initial three year construction phase. The pattern of production is expected to be 'ramp' shaped with production increasing to 4.5 million tonnes and continuing at this level over the life of the mine.

- The analysis in this and the following section provides estimates of output and employment impacts over the first five years of operation after over which the costs of operating the mine are expected to stabilise. After year five, the estimated operational expenditures and employment from the mine are reported as *Average ongoing*.

- As a result of the operational expenditures made by the Wallarah 2 Coal Project (i.e. the initial impacts as outlined in Section 5.2.3) flow-ons will be generated from the production and consumption induced impacts. The production induced impacts will include the activity that is generated in industries that support mining activities, such as engineering services and transport and the industries that support those industries. The increase in activity will create more jobs and employment will rise. The increase in the number of pay packets in the local economy will stimulate consumer demand and this will, in turn, generate further economic benefits. The flow-on impacts (production and consumption) rise from $53.0 million in year 1 to $121 million in year 5. Thereafter, the output impacts are expected to average around $131 million per annum for as long as the mine maintains the assumed level of annual coal output (i.e. 4.5 million tonnes per annum).

- As a result of the mine's operations, the estimated total output impact (initial + total flow-on) on the Central Coast economy will rise from $87 million in the first year of operation to $198 million in year five. Thereafter, the output impacts are expected to average around $214 million per annum for as long as the mine maintains the assumed level of annual coal output. Table 5-4 shows the output impacts over this time frame.

Table 5-4 Estimated output impacts from the operation of the Wallarah 2 Coal Project

	Output impacts					
	Year 1 $m	**Year 2 $m**	**Year 3 $m**	**Year 4 $m**	**Year 5 $m**	**Ongoing average $m**
Initial	53.0	74.1	93.9	120.0	121.3	130.8
Production	15.1	19.5	25.9	32.3	33.0	35.0
Consumption	19.2	27.6	33.0	43.8	44.1	48.4
Total flow-on	34.2	47.1	58.8	76.1	77.1	83.4
TOTAL OUTPUT IMPACT	**87.2**	**121.2**	**152.7**	**196.1**	**198.4**	**214.2**

5.2.5 Economic impact of operating the Wallarah 2 Coal Project - employment impacts

- As noted, the output from the Wallarah 2 Coal Project is expected to start after the three year construction phase. The initial employment created from the operations is the employment at the mine site. *A job in I-O analysis is defined as being full-time and lasting for one year.*

- At the mine site, 250 jobs will be initially created in the first year of operation and this will increase to 300 jobs. Employment is estimated to remain at this level for the life of the mine.

- As a result of the initial employment, flow-on employment will be generated from the production and consumption induced impacts. The flow-on employment will rise from 178 jobs in the first year of operation to 393 jobs in year five. Thereafter, flow-on employment is expected to average around 426 jobs over the remaining life of the mine.

- The combined total of initial and flow-on employment is estimated to generate 428 jobs in the first year of operation which will rise to 693 jobs in year five. Thereafter, total of initial and flow-on employment generated because of the Wallarah 2 Coal Project will average around 726 jobs over the remaining life of the mine.

- The pattern of employment impacts is shown in Table 5-5.

Table 5-5 Estimated employment impacts from the operation of the Wallarah 2 Coal Project

	Employment impacts					
	Year 1 Jobs	**Year 2 Jobs**	**Year 3 Jobs**	**Year 4 Jobs**	**Year 5 Jobs**	**Average ongoing**
Initial	250	300	300	300	300	300
Production	67	87	111	136	138	147
Consumption	111	159	190	253	255	280
Total flow-on	178	247	301	389	393	426
TOTAL JOB IMPACT	**428**	**547**	**601**	**689**	**693**	**726**

5.2.6 Additional benefits generated by the operation of the Wallarah 2 Coal Project

Royalties

Regardless of their location, most minerals in NSW are owned by the people of NSW, as represented by the Crown. In exchange for the right to extract minerals in NSW, royalties are paid to the Crown by the leaseholder of the mining operation. NSW Legislation identifies the rate and point at which these royalties are charged.[9] Leaseholders determine the royalties owed and submit regular assessments and payments to the NSW Department of Primary Industries and these assessments are regularly audited by the Department.[9]

Coal royalties were adjusted by the NSW Government in the 2008 Mini-Budget. These adjustments no longer allowed coal miners to calculate royalties after deducting transport costs. They also changed the coal royalty rates – all of which increased from 1 January 2008,[10] as shown in Table 5-6.

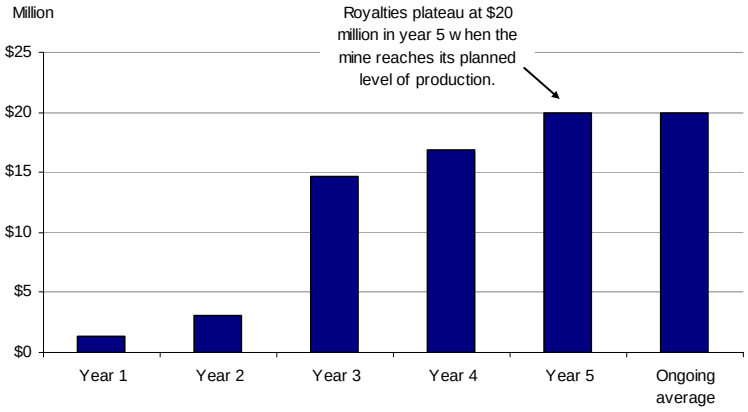
Table 5-6 Coal royalties in NSW up to the end of 2008 and from 1 January 2009

	Up to end 2008	From 1 January 2009
Open cut mining	7%	8.2%
Underground mining	6%	7.2%
Deep underground mining	5%	6.2%

Source: NSW Government Mini-Budget 2008-09

The expected value of these royalties was estimated by the Wallarah 2 Coal Project based on the royalty rates effective from 1 January 2009. They will be payable from the first year of the mine's production and plateau when production reaches 4.5 million tonnes. The royalties will continue at this level while production levels are maintained. The expected revenue for the NSW Government from the operation of the Wallarah 2 Coal Project is expected to start at $1.4 million per annum and reach $20 million per annum by year five. Thereafter, the royalties are expected to remain at $20 million per annum for the life of the mine. The value of these estimated royalties is shown in Figure 5.2.

Figure 5.2 Estimated royalties paid to the NSW Government for the operation of the Wallarah 2 Coal Project



Source: Wallarah 2 Coal Project

Delivery of utilities to the Tooheys Road site

The location of the Wallarah 2 Coal Project is near the Sydney-Newcastle F3 freeway. While most of the site is on the western side of the Freeway, some site development (Tooheys Road site) is on the eastern side of the Freeway and is zoned as industrial land. This had been earmarked as

future employment lands by the Department of Infrastructure and Planning.[2, 4] Currently the provision of services such as roads, water, power and telecommunications to this location is low.[2] The development of this site by the Wallarah 2 Coal Project will include the provision of these and other services. As the Wallarah 2 Coal Project will be underwriting the initial cost of these services, the subsequent provision of these services to firms who locate near the mine will be reduced. This could also provide a financial incentive for industries which support mining operations to locate in the area.[2]

Additional employment generated in the Hunter Region because of the operation of the Wallarah 2 Coal Project

Some of the economic impacts generated by the *operation* of the Wallarah 2 Coal Project are expected to spill over into the neighbouring Hunter Region. This spillover will result from the closeness of the proposed mine site to the boundary with the Hunter Region, and the Hunter's historical association with coal mining. Specifically, it is expected that demand for some services available in the Hunter Region, such as specialised engineering, will be created by the operation of the proposed mine. The additional employment benefits which are estimated to accrue to the Hunter Region from the Wallarah 2 Coal Project are shown in Table 5-7.

Table 5-7 Hunter Region employment impacts from the operation of the Wallarah 2 Coal Project

	Employment impacts (number of jobs)					
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Ongoing average**
Initial	0	0	0	0	0	0
Production	13	37	57	83	85	88
Consumption	89	145	173	239	241	336
Total flow-on	102	182	230	322	326	336
TOTAL JOB IMPACT	**102**	**182**	**230**	**322**	**326**	**336**

5.2.7 Summary of economic impacts

- The Wallarah 2 Coal Project is a proposed development on the Central Coast of NSW. If the proposal proceeds, construction is expected to require three years.

- The mine is expected to start operations with an estimated output of 0.3 million tonnes per annum. This output will rise to an estimated 4.5 million tonnes per annum.

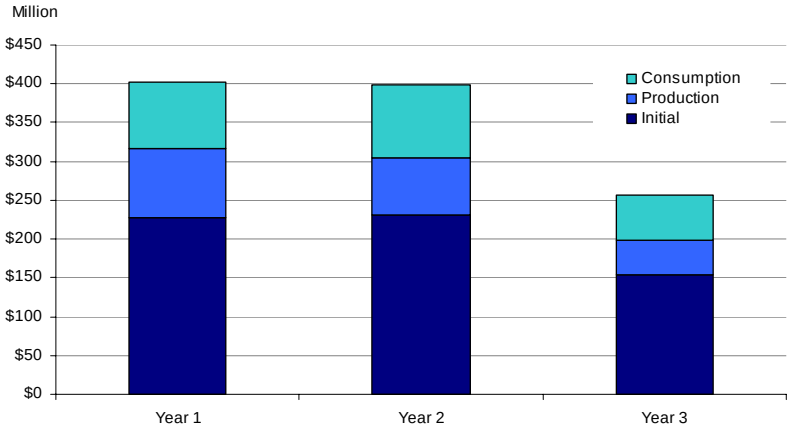
Constructing the Wallarah 2 Coal Project

- The pattern of expenditures required to develop the Wallarah 2 Coal Project has been shown in Figure 5.3. Over the three years of construction the largest initial expenditures will be directed to the sectors of: *Machinery etc*. (270 million); *Construction* ($168 million); *Transport equipment* ($59 million); *Retail* ($26 million); and *Property and business*

services ($20 million). The total initial expenditures are estimated to be $613 million over the three year construction period

- As a result of the construction and preparation works required to undertake the contract, the estimated total output impact on the Central Coast economy will be $1,058 million over the three year construction period.

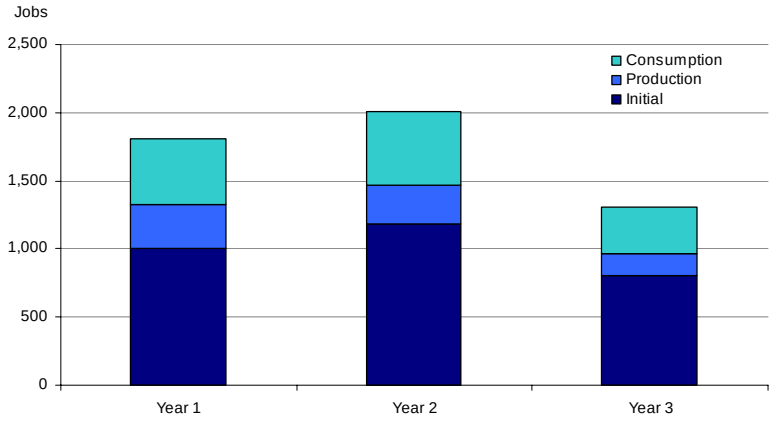
Figure 5.3 Estimated output impacts from the construction of the Wallarah 2 Coal Project



Source: CCRF and Wallarah 2 Coal Project

- The pattern of initial and flow-on employment that is estimated to be generated from the construction of the Wallarah 2 Coal Project is shown in Figure 5.4. In total, an estimated 5,125 jobs are expected to be created on the Central Coast as a result of the mine's three year construction. **NOTE**: *A job in IO analysis is defined as lasting for one year and being full-time*.

Figure 5.4 Estimated employment impacts from the construction of the Wallarah 2 Coal Project

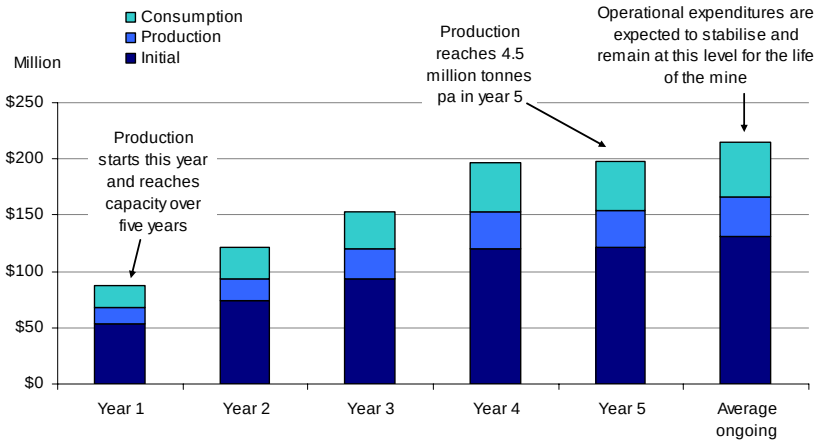


Source: CCRF and Wallarah 2 Coal Project

Operating the Wallarah 2 Coal Project

- The pattern of expected operational expenditures was taken to be the initial impact from the operation of the proposed Wallarah 2 Coal Project. The total output impact, that is the total value of goods and services, that are produced because of the operation of the Wallarah 2 Coal Project, will be directly dependent on the size of the mine's operational expenditures and will continue for as long as the operational expenditures continue. The output impacts include the 'pay packet effect' which is the rise in the level of demand in response to more consumer spending. This rise in demand causes an increase in the production of goods and services. The initial and flow-on output impacts are shown in Figure 5.5.

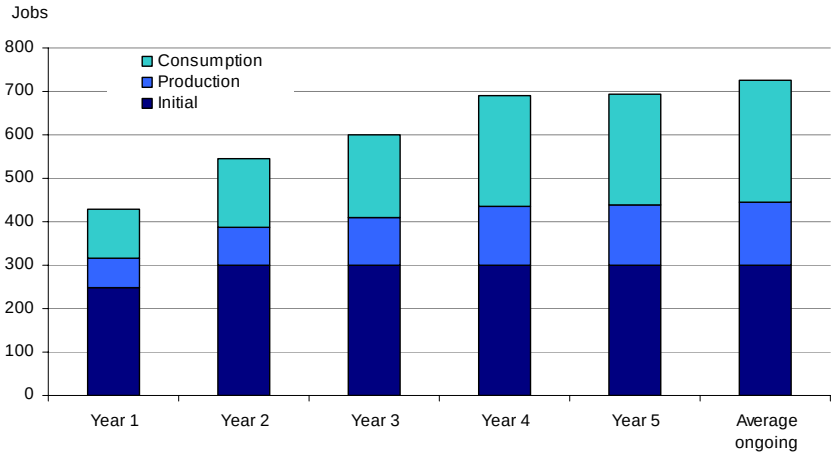
Figure 5.5 Estimated output impacts from the operation of the Wallarah 2 Coal Project



Source: CCRF and Wallarah 2 Coal Project

- The pattern of expected employment from the Wallarah 2 Coal Project is shown in Figure 5.6. This figure also shows the flow-on impacts that are anticipated from these expenditures. The flow-on impacts result from an increase in activity that is generated by the Wallarah 2 Coal Project.

Figure 5.6 Estimated employment impacts from the operation of the Wallarah 2 Coal Project



Source: CCRF and Wallarah 2 Coal Project

Additional economic benefits

- In return for the right to extract minerals, royalties will be paid to the NSW Government. The expected value of these royalties was estimated by the Wallarah 2 Coal Project to start at $1.4m per annum in year one and reach $20m when production plateaus.

- The development of the Tooheys Road site will include the provision of power, water and other utilities. The currently the availability of these services close to the Tooheys Road site is poor. As the Wallarah 2 Coal Project will be underwriting the initial cost of provision, the cost of these services to firms who locate near the site will be reduced. This could also provide a financial incentive for industries which support mining operations to locate in the area.[2]

- It is expected that demand for some services available in the Hunter Region, such as specialised engineering, will be created by the operation of the proposed Wallarah 2 Coal Project. As a result of this demand, additional employment is anticipated to be created in the Hunter Region. These additional flow-on impacts are estimated to be 102 jobs in year one rising to 336 jobs by year five.

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Appendix 1: Sectors in the I-O model

1. AGRICULTURE	***Agriculture***: plant nurseries, cut flower and flower seed growing, vegetable growing. Grape, apple & pear, stone fruit and kiwi fruit growing. Grain growing, grain-sheep and grain-beef cattle farming, sheep-beef cattle farming, sheep and beef cattle farming, dairy cattle farming, poultry farming (eggs and meat), pig, horse, and deer farming. Sugar cane and cotton growing.
	Services to Agriculture: cotton ginning, shearing, and aerial agricultural services.
	Hunting and Trapping
	Forestry and Logging: forestry, logging, services to forestry.
	Commercial Fishing: rock lobster and prawn fishing, finfish trawling, squid jigging, line fishing. Aquaculture.
2. MINING	***Coal Mining***: black coal and brown coal.
	Oil and Gas Extraction.
	Metal Ore Mining: iron ore, bauxite, copper ore, gold ore, mineral sand, nickel ore, silver-lead-zinc ore.
	Other Mining: gravel and sand quarrying, construction material.
	Services to Mining: exploration (petroleum and minerals) and other services to mining.

3.	**MEAT & MILK PRODUCTS, FOOD PRODUCTS, AND BEVERAGES & TOBACCO PRODUCTS**	***Meat and Milk Products***: meat and poultry processing, bacon, ham, and smallgoods. Milk and cream processing, ice cream and dairy products. ***Food Products***: fruit and vegetable processing. Oil and fat. Flour mill products cereal food and baking mixes, bread, cakes and pastry and biscuits. Sugar, confectionary, seafood, prepared animal and bird food. ***Beverages***: soft drink, cordial and syrup, beer and malt, wine, spirits. ***Tobacco***: cigarettes, cigars, and snuff.
4.	**TEXTILES, CLOTHING AND FOOTWEAR**	***Textiles***: wool scouring, synthetic fibre textiles, cotton textiles, wool textiles, textile finishing. Made-up textile products, textile floor coverings, rope, cordage, and twine. ***Clothing***: hosiery, cardigans and pullovers. Men's and boy's wear, women's and girl's wear, sleepwear, underwear, infant clothing. ***Footwear***. ***Leather***: Leather tanning and fur dressing. Leather and leather substitute products.
5.	**WOOD AND WOOD PRODUCTS**	Log sawmilling, woodchipping, timber resawing and dressing. Plywoods and veneers, fabricated wood, wooden structural components.
6.	**PAPER & PRINTING**	***Paper***: pulp, paper and paperboard, solid paperboard containers, corrugated paperboard containers, paper bags and sacks. ***Printing***: paper stationary, printing (including screen printing) and services to printing. Newspaper printing or publishing, other periodical publishing, book and other publishing. Recording media manufacturing and publishing.
7.	**PETROLEUM AND COAL PRODUCTS**	Petroleum refining, petroleum and coal product manufacturing.

8.	**CHEMICALS**	Fertilisers, industrial gases, synthetic resins, organic and inorganic industrial chemicals. Explosives, paint, medicinal and pharmaceutical products, pesticides, soap and other detergents, cosmetic and toiletry precursor products, inks, dyes, pigments.
9.	**NON-METALLIC MINERAL PRODUCTS**	Glass and glass products. Clay bricks and ceramic products, ceramic tiles and pipes. Cement and lime, plaster products, concrete slurry, concrete pipe and box culverts.
10.	**BASIC IRON AND STEEL**	Basic iron and steel, iron and steel casting and forging, steel pipes and tubes.
11.	**OTHER BASIC METALS**	Alumina production, aluminium smelting, copper, silver, lead, and zinc smelting and refining. Basic non-ferrous metals. Aluminium and non-ferrous metal rolling, drawing, extruding; non-ferrous metal casting.
12.	**FABRICATED METAL PRODUCTS**	Structural steel fabricating, architectural aluminium products, structural metal products. Hand tools and general hardware, wire products and springs, nuts, bolts, screws, and rivets, metal coating and finishing, non-ferrous pipe fitting.
13.	**TRANSPORT EQUIPMENT**	Motor vehicles, motor vehicle bodies, automotive electrical components and instruments. Shipbuilding, boatbuilding, aircraft manufacturing, and railway equipment manufacturing.

14.	**MACHINERY, RUBBER & PLASTIC PRODUCTS, AND MISCELLANEOUS MANUFACTURING**	***Machinery***: photographic and optical goods, medical and surgical equipment, professional and scientific equipment. Computers and business machines; telecommunication, broadcasting and transceiving equipment. Household appliances, electric cable and wire, batteries, electric lights and signs. Agricultural machinery, mining and construction machinery, food processing machinery, machine tools and parts, lifting and material handling equipment, pumps and compressors, commercial space heating and cooling equipment.
		Rubber & Plastic Products: rubber tyres and rubber products. Plastic blow-moulded products, plastic extruded products, plastic bag and film manufacturing, plastic rigid fibre reinforced products, plastic foam products, plastic injection moulded products.
		Miscellaneous Manufacturing: prefabricated metal buildings, wooden furniture and upholstered seats, sheet metal furniture, mattresses (except rubber), jewellery and silverware, toys and sporting goods.
15.	**ELECTRICITY, GAS AND WATER**	Electricity and gas supply.
		Water supply and sewerage and drainage services
16.	**CONSTRUCTION**	***General Construction***: house, residential and non-residential building construction; road, bridge and other non-building construction.
		Construction Trade Services: site preparation, concreting, bricklaying, roofing, structural steel erection, plumbing, electrical installation, air conditioning, and fire & security system services. Plastering and plasterboard fitting, carpentry, tiling, painting and decorating, glazing, landscaping.

17.	**WHOLESALE TRADE**	***Basic Materials***: wool, cereal grain, farm produce and supplies, petroleum products, metals and minerals, chemicals, timber and building supplies.
		Machinery and Motor Vehicles: farm and construction machinery, professional equipment, computers, business machines, electrical and electronic equipment, cars, commercial vehicles, and new motor vehicle parts, motor vehicle dismantling, used motor vehicle parts.
		Personal and Household Goods: meat, poultry and smallgoods, dairy produce, fish, fruit and vegetables, confectionary and soft drinks, liquor, tobacco products, groceries.
		Textiles, Clothing, and Footwear: textiles, clothing, footwear, household appliances, furniture, floor coverings, household goods, photographic equipment, jewellery and watches, toys and sporting goods, books and magazines, paper products, pharmaceuticals and toiletries.
18.	**RETAIL TRADE**	***Food***: supermarket and grocery stores, fresh meat, fish, poultry, fruit and vegetables, liquor, bread and cakes, take-away food, milk vending.
		Personal and Household Goods: department stores, clothing, footwear, fabrics, soft goods, furniture, floor coverings, domestic hardware, houseware, appliances, recorded music, sports and camping equipment, toys and games, newspapers, books, stationery, photographic equipment, marine equipment, pharmaceuticals, cosmetics and toiletries, antiques and used goods, garden equipment, flowers, watches and jewellery.
		Motor Vehicles: motor cars, motor cycles, trailers and caravans, automotive fuel and electrical services, tyres.
19.	**REPAIRS**	Smash repairing, automotive repairs and services, panel beaters and painters, household equipment repair services, industrial and business equipment repairers.
20.	**ACCOMMODATION CAFES AND RESTAURANTS**	Accommodation, pubs, taverns, and bars, cafes, restaurants, and clubs (hospitality).

21.	**TRANSPORT AND STORAGE**	***Transport***: road freight transport, long and short distance bus transport (including tramway), taxi and other road passenger transport, rail transport, international sea transport, coastal and inland water transport, scheduled international and domestic air transport, non-scheduled air and space transport, pipeline transport. Parking services and other services to road transport. Stevedoring, water transport terminals, port operators, other services to water transport. Services to air transport. Other services to transport; including travel agency services, road freight forwarding, freight forwarding (except road), customs agency services. ***Storage***: grain storage, cold storage, warehousing.
22.	**COMMUNICATION SERVICES**	Postal services, courier services (light), telecommunication services.
23.	**FINANCE AND INSURANCE**	***Finance***: central bank, banks, building societies, credit unions, money market dealers, other financiers, financial asset investors, financial asset broking services and other services to finance and investment. ***Insurance***: life insurance, superannuation funds, health insurance, general insurance, services to insurance.
24.	**PROPERTY AND BUSINESS SERVICES**	***Property services***: property operators and developers, real estate agents, non-financial asset investors, machinery and equipment hiring and leasing. ***Business services***: scientific research, architectural, surveying, consulting engineering, data processing, information storage and retrieval, computer maintenance and consultancy, legal and accounting services, advertising, commercial art and display, market research, and business administrative services. Employment placement, contract staff and secretarial services, security and investigative services, pest control, cleaning, contract packing services.
25.	**GOVERNMENT ADMINISTRATION AND DEFENCE**	***Government Administration***: central, state and local government, justice, foreign government representation. ***Defence***.
26.	**EDUCATION**	Preschools, primary, secondary, and combined primary and secondary schools, special schools, higher education, technical and further education.

27.	**HEALTH AND COMMUNITY SERVICES**	***Health Services***: hospitals (except psychiatric hospitals), psychiatric hospitals, nursing homes, general practice medical services, specialist medical services, dental services, pathology services, optometry and optical dispensing, ambulance services, community health centres, physiotherapy services, chiropractic services. Veterinary services. ***Community Services***: child care services, accommodation for the aged, residential and non-residential care services.
28.	**CULTURAL AND RECREATIONAL SERVICES**	***Cultural Services***: film and video production and distribution, motion picture exhibition, radio services, television services, libraries, museums, zoological and botanic gardens, recreational parks and gardens, music and theatre production, creative arts, sound recording studios, performing arts venues, services to the arts. ***Recreational Services***: horse and dog racing, sports grounds and facilities, sports and services to sports, lotteries, casinos, gambling services.
29.	**PERSONAL AND OTHER SERVICES**	***Personal Services***: video hire outlets, personal and household goods hiring. Laundry, dry-cleaning, hairdressers and beauty salons, photography services, funeral directors and cemeteries, gardening services, private household staff (maids, caretakers etc.). ***Other Services***: welfare, charitable, religious institutions. Professional, scientific, and labour organisations, political parties. Police, fire brigade, waste disposal services, corrective centres.