



MOOLARBEN COAL PROJECT

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*Estimates of
Regional Economic Impacts
from the Moolarben Coal Project*

Estimates of Regional Economic Impacts
from the Construction and Operation
of the Moolarben Coal Project:
Environmental Assessment No. 2

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Job no. 208/08

Estimates of Regional Economic Impacts from the Construction and Operation of the Moolarben Coal Project: Environmental Assessment No. 2

Prepared for

Wells Environmental Services

On behalf of

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Executive summary

Background

- In April 2006 the Hunter Valley Research Foundation (HVRF) completed an assessment of the regional economic benefits expected to be generated from the construction and subsequent operation of the Moolarben Coal Project (Stage 1), located near Ulan in the Mid-Western Regional Council local government area (LGA). At that time the proposed project included three open cut mines and an underground mine, together with a coal preparation plant, coal handling and storage facilities, a rail loop and train loading system, and associated mine infrastructure and services. Further geological surveys have determined that more extensive coal reserves are located within EL 6288. Consequently, the scope of the project has been expanded to comprise one additional open cut mine and two additional underground mines, with a revised infrastructure.
- This document provides a reassessment of the economic benefits to the local region, accounting for the expanded scope of the project, as part of Environmental Assessment No.2 (EA2). The region is defined as the combined *Hunter Region and Mid-Western Regional Council area*.
- Benefits generated from both the construction and ongoing operation of the Moolarben Coal Project were assessed by the HVRF using input-output (I-O) analysis. Impacts were identified according to *direct* and *induced* effects, measured in terms of the value of output generated and the number of jobs created in the regional economy. It is anticipated that a majority of the direct impacts, as well as a substantial proportion of the induced impacts, will accrue in the townships of Mudgee and Gulgong.
- Estimates are also provided for taxation revenues generated for the Federal and State Governments, as well as revenue for the State Government from production-related royalty payments.
- It is noted:
 - (i) Since the 2006 assessment the HVRF model has been updated to incorporate major structural shifts in the regional economy. In general, as the economy has expanded and diversified, leakages outside the region have been reduced and the size of the multiplier impacts within the region have increased. Larger multipliers, the increased scope of the Moolarben Coal Project, and higher coal prices reflected in the revenue projections for the project have resulted in substantially higher estimates of the economic benefits expected to be generated.
 - (ii) Between 2009-10 (the first year in which production is expected from the Moolarben Coal Project) and 2013-14 (the final year of substantial construction expenditure), the regional economy will benefit from the accumulated impacts of both the construction and operation of the facilities.

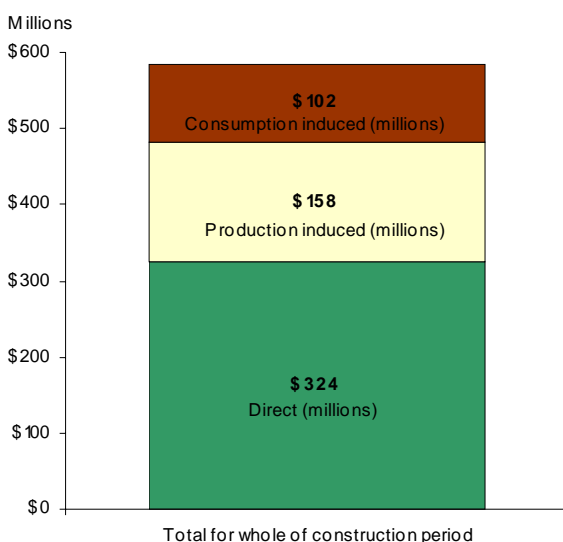
- In the analysis:
 - A job is defined as a full-time position which lasts for one year.
 - All currency values are in terms of 2008 Australian dollars.
 - Values are calculated to the nearest whole unit. However, the values of the impacts are estimates, and should be considered in terms of round numbers.

Economic impacts from construction

Investment of \$324 million over six years for construction of the mining facilities, including expenditure within the region on mining equipment, is expected to...

- Stimulate additional production in the region valued at approximately \$158 million and additional consumption worth \$102 million: an induced benefit of \$260 million, providing a total benefit to the region valued at \$584 million.
- Directly create an average of 282 full-time equivalent jobs in each year of construction. Additional production in the region will generate a further 87 jobs, and additional consumption will create a further 98 jobs: an induced benefit of 184 jobs, providing a total employment benefit to the region of 467 full-time equivalent positions, on average, in each year of the construction period. The accumulated benefit over the six-year construction period will be 2,800 jobs.
- Generate the greatest impacts in the first and second years when construction expenditure is at its highest.

Output impacts from construction
Total impacts for the whole six-year period



Source: Hunter Valley Research Foundation, 2008

Employment impacts from construction
Average impacts in each of the six years



Source: Hunter Valley Research Foundation, 2008

- Yield taxation revenue to the Federal Government of almost \$46 million: \$29 million from income tax, \$9 million from indirect taxes and \$8 million from company tax. Payroll taxation revenue to the State Government is estimated at more than \$8 million, providing a total public sector benefit of close to \$28 million.

In the 2006 assessment, construction expenditure of \$150 million was expected to...

- Provide a total output benefit to the region of approximately \$267 million. The total value of output of \$584 million expected to be generated in the region according to the EA2 estimates is almost 2.2 times higher than estimated in 2006.
- Generate direct and induced employment in the region of about 438 full-time equivalent positions in each of the two years of construction, an accumulated benefit of 876 jobs. The accumulated benefit of 2,800 jobs according to the EA2 estimates is more than three times higher than estimated in 2006, mainly as a result of the higher construction spend over a longer period
- Yield Federal and State Government taxation revenue of close to \$22 million. The total value of taxation revenue of \$54 million expected to be generated according to the EA2 estimates is 2.8 times higher than estimated in 2006.

Economic impacts from production

- Production is expected to commence in early 2010, with output from Open Cut No.1 mine. Production will be expanded progressively until 2016-17 (Year 8) when open cut and underground mining will be at full production. Maximum production is expected to be maintained for a further 14 years, until 2030-31. Consequently, the regional economic benefits specified for 2016-17 will be maintained in each year of the maximum production period. They will decline thereafter in proportion to the reduction in output, and will be extinguished with the end of the economic life of the facility, estimated to be around 2038-39.

Production schedule for the Moolarben Coal Project (EA2)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8 to Year 23
	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17 - 2030-31
Tonnage (million tonnes)								
Open cut	5.3	8.3	8.6	9.0	9.0	9.0	9.0	9.4
Underground	0	0	0	0	0.5	3.6	3.6	3.6
Total	5.3	8.3	8.6	9.0	9.5	12.6	12.6	13.0
Value (\$ million)								
Total	\$315	\$495	\$517	\$540	\$570	\$756	\$756	\$780
Employment (full-time equivalent)								
Total	130	200	250	250	300	400	439	439
Royalty payments (\$ million)								
6% value prod'n	\$18.90	\$29.70	\$31.03	\$32.40	\$34.20	\$45.36	\$45.36	\$46.80

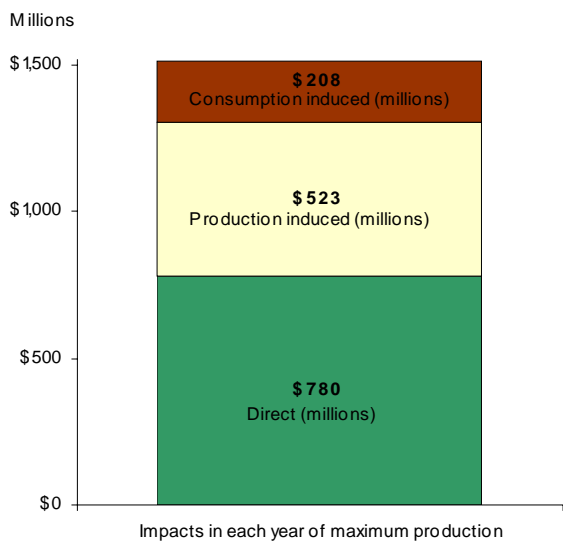
Note:

- The value of output is assumed to average \$60 per tonne in each year of the production period.
- Saleable production (shown above) is estimated at approximately 75 per cent of gross (rate of mine) production from open cut mines and 90 per cent of gross production from underground mines.

When production revenue is maximised at \$780 million per annum in the eight year of operation, the coal mining activities will...

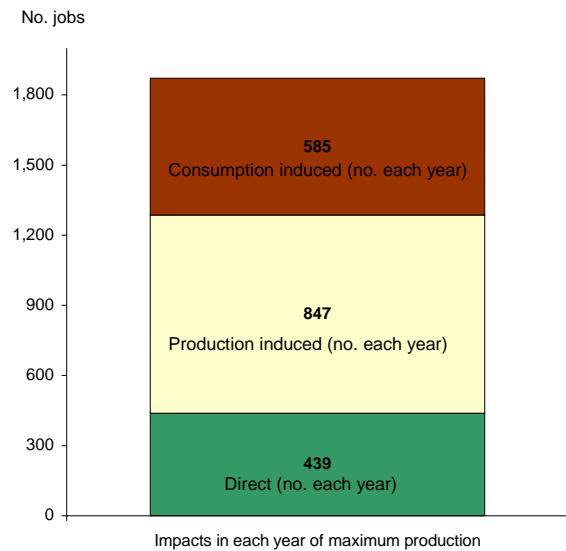
- Stimulate further output in the region valued at approximately \$731 million: \$523 million from additional production and \$208 million from additional consumption. The total output impact in each year of maximum production is expected to be valued at more than \$1.5 billion.
- Directly create around 439 full-time equivalent positions in the mining operations. Additional production and consumption in the region will generate a further 847 and 585 jobs respectively: an induced employment benefit of 1,432 jobs. In total, approximately 1,875 full-time equivalent positions will be created in the region in each year of maximum production.

Output impacts from operation
Impacts in each year of maximum production



Source: Hunter Valley Research Foundation, 2008

Employment impacts from operation
Impacts in each year of maximum production



Source: Hunter Valley Research Foundation, 2008

- Yield Federal Government taxation receipts of approximately \$98 million: \$60 million from income tax, \$19 million from indirect taxes, and \$20 million from company tax. Payroll taxation revenue to the State Government is estimated at close to \$17 million, yielding a total public sector benefit of almost \$115 million in each financial year of maximum production.
- Generate around \$47 million per annum in production royalties to the State Government, providing a total of \$1,086 million over the 30 years between 2009-10 and 2038-39.

Under the production/value-of-coal scenario considered for the 2006 assessment, maximum revenue of \$356 million per annum in the fourth year of operation was estimated to...

- Provide a total annual output impact of approximately \$664 million. The revised estimates indicate a more than doubling of the expected regional output benefits from the operation of the Moolarben Coal Project, mainly as a result of the stimulus provided to regional production.
- Generate a total of approximately 910 full-time equivalent positions each year in the region from Year 11. The revised estimates indicate a more than doubling of the expected regional employment benefits from the operation of Project, again mainly as a result of the stimulus provided to regional production.
- Yield Federal and State Government taxation receipts of approximately \$69 million per annum. The revised estimates indicate a 55 per cent increase in the expected total of government taxation revenues from the Project's operation.
- Generate a total of around \$341 million in production royalties for the State Government over the expected 14 year production period. Revised estimates for the EA2 operations suggest an approximate three-fold increase in royalty revenues.



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1 Introduction

1.1 The Moolarben Coal Project

In April 2006 the Hunter Valley Research Foundation (HVRF) completed an assessment of the regional economic benefits expected to be generated from the construction and subsequent operation of the Moolarben Coal Project (Stage 1), located near Ulan in the Mid-Western Regional Council local government area (LGA). At that time the proposed project included three open cut mines and an underground mine, together with a coal preparation plant, coal handling and storage facilities, a rail loop and train loading system, and associated mine infrastructure and services. Further geological surveys have determined that more extensive coal reserves are located within Exploration Licence No.6288. Consequently, the scope of the project has been expanded to comprise one additional open cut mine and two additional underground mines, with a revised infrastructure. The mines are to be staged in accordance with the schedule outlined in Section 2, and detailed in the Appendix of this report. Thermal coal will be produced for the domestic and export markets.

This document provides a reassessment of the economic benefits to the local region, accounting for the expanded scope of the project, as part of Environmental Assessment No.2 (EA2). The study was commissioned by Wells Environmental Services, on behalf of Moolarben Coal Mines Pty Ltd.

Economic benefits generated from both the construction and ongoing operation of the Moolarben Coal Project were assessed by the HVRF using input-output (I-O) analysis. Impacts were identified according to *direct* and *induced* effects, measured in terms of the value of output generated and the number of jobs created in the regional economy (induced effects are sometimes referred to as *flow-on* effects). Estimates are also provided for taxation revenues generated for the Federal and State Governments.

The following points are noted in respect of the EA2 estimates:

- (i) Since the 2006 assessment the HVRF model has been updated to incorporate major structural shifts in the regional economy. In general, as the economy has expanded and diversified, leakages outside the region have been reduced and the size of the multiplier impacts within the region have increased. Larger multipliers, the increased scope of the Moolarben Coal Project, and higher coal prices reflected in the revenue projections for the project have resulted in substantially higher estimates of the economic benefits expected to be generated.
- (ii) Between 2009-10 (the first year in which production is expected from the Moolarben Coal Project) and 2013-14 (the final year of substantial construction expenditure), the regional economy will benefit from the accumulated impacts of both the construction and operation of the facilities.



2 Economic impact analysis

2.1 The HVRF input-output model

Estimates are provided of the economic impacts generated in the local region resulting from the construction and ongoing operation of the proposed Moolarben Coal Project. The region refers to the **combined Hunter Region and Mid-Western Regional Council area**. The estimates have been compiled using input-output (I-O) analysis and the current version of the I-O model of the Hunter Region economy developed by the Hunter Valley Research Foundation (HVRF). The model is survey-based, comprising 29 sectors. Leakages from each sector are assessed using the information provided by firms in the survey sample.

While Ulan is (now) outside the Hunter, the HVRF model has been used as the basis of the economic impact analysis since:

- (i) Ulan is close to the Hunter Region's western border. Prior to the amalgamation of local government areas in March 2004 Ulan was located within the Merriwa Shire which, in turn, formed part of the Hunter Regional Environmental Plan (1989).
- (ii) Given the relative importance of mining and agriculture to the Hunter's economy, the HVRF model is considered a reasonable approximation of the structure of the broader economy in which the project is proposed.
- (iii) Large power stations located in the Hunter's Singleton and Muswellbrook LGAs, and the Port of Newcastle in the Newcastle LGA mean that a proportion of the flow-on benefits from the project will be generated in the Hunter.
- (iv) In order to determine the magnitude of the regional economic impacts, the HVRF model is considered more appropriate than interpolative regional economic models which 'factor down' the multipliers derived from the national I-O model produced by the ABS. These types of models are thought to be less reliable because the assessment of leakages from the local economy (which reduce the size of the local economic impacts) are often based on secondary data (such as employment) or by assuming 'a reasonable' amount.

In the HVRF model:

- *A job is defined as a full-time position which lasts for one year.*
- All currency values are in terms of 2008 Australian dollars.
- Values are calculated to the nearest whole unit. However, the values of the impacts are estimates, and should be considered in terms of round numbers.

2.2 Input-output analysis

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 **direct** (or initial) impacts of the final expenditure and the **induced** (or flow-on) impacts as all sectors provide inputs to enable the final production. The impacts are quantified using multiplier coefficients derived from the model, in terms of the value of the goods and services and the number of jobs which result from production of the specified good or service and the expenditure of salaries and other income earned due to that production. Estimates are also provided for taxation revenues generated for the Federal and State Governments.

For the Moolarbern Coal Project, economic impacts will first result from **construction** of the mining facilities over the planned two-year period. During this period, the direct output impact is measured by the value of the capital expenditure on the facilities. Direct and induced impacts result as jobs are created on the construction and related sites, and as firms which manufacture the materials and components necessary to construct the facilities buy, from various suppliers, the raw materials and services required for the production of their own products. In turn, these suppliers purchase inputs for the production of their products and services and employment increases to enable the production of these required raw materials and services at all stages of production. These effects are referred to as *production induced* impacts. Additional, *consumption induced* impacts will occur during construction of the facilities as the recipients of income derived (in the form of profits, dividends, wages and salaries) make purchases which generate output and employment.

The direct (annual) output impact of the **operation** of the proposed mining facilities is measured by the value of the coal output. Employment is generated onsite to operate and maintain the facilities, and elsewhere in the region as raw material inputs (spare parts, fuel, utilities etc.) and services are purchased from various suppliers. In turn, these suppliers need to purchase inputs necessary for the production of their own products. Employment increases to enable production of these required raw materials and services at all stages of production, and income will be generated, and spent, in each stage.

During both construction and ongoing operation of the project, it is anticipated that a majority of the direct impacts, as well as a substantial proportion of the induced impacts, will accrue in the townships of Mudgee and Gulgong in the Mid-Western Regional Council LGA.

Stimulating output and employment throughout the regional economy will also increase government revenue through increased **taxation receipts**. Federal and State Government taxation revenues are calculated by the HVRF I-O model under relatively conservative assumptions. The estimates are, therefore, considered to represent the lower bounds of potential receipts.

In addition to payroll taxation receipts (estimated by the IO model), the State Government will receive revenues based upon the tonnage of coal output from the project in each year. These include rail freight charges, port charges, royalties and other taxes. The estimated value of royalties is included in this report, but no estimates have been made for the revenue derived from other sources.

Additional revenue will also be derived by local Councils (particularly the Mid-Western Regional Council) through rate payments and fees associated with the approval of investment plans, though this revenue is not projected by the model.

2.3 Construction impacts

(i) Construction expenditure

Expenditure on construction of the facilities is estimated to total \$525 million over the six years to 2013-14. Stage 1 and Stage 2 components of this total are shown in Table 1. The equipment cost of \$242 million is comprised of \$151 million for open cut mining equipment and \$91 million for underground mining equipment.

Table 1: Stage 1 and Stage 2 total construction costs for the Moolarben Coal Project

Component	Value
Construction	
Stage 1	\$205 million
Stage 2	\$78 million
Total construction	\$283 million
Equipment	
Stage 1 (open cut and underground)	\$200 million
Stage 2 (open cut)	\$42 million
Total	\$242 million
Total cost	
Stage 1 and Stage 2	\$525 million

For the purposes of the economic impact assessment:

- The full value of construction expenditure (\$283 million) has been used on the basis that the I-O model is sufficiently robust to account for likely expenditure inside and outside the region.
- Only a proportion of the expenditure on mining equipment has been used since it is known with reasonable certainty that the majority of this expenditure will be outside the region. It has been assumed that 15 per cent of the cost of the open cut equipment (\$23 million) and 20 per cent of the cost of the underground equipment (\$18 million) will be made in the region, primarily for local manufacture and transport.

Consequently, the construction impacts in the region from the Moolarben Coal Project have been calculated on the basis of total expenditure of \$324 million, comprised of \$283 million for expenditure on construction and \$41 million for expenditure on equipment.

In the 2006 assessment, construction expenditure was expected to total \$150 million over two years. This total was subsequently upgraded to \$205 million.

The EA2 expenditure will be in 16 of the 29 sectors described by the HVRF I-O model. Since the size of the multipliers differ in each sector, the total cost of the facilities was apportioned according to the sector of the economy in which the expenditure will be made, and the induced impacts assessed using the different multipliers for each of these sectors. Table 2 provides details of the expenditure schedule, the proportional contribution of each sector to the total, and the proportion of total expenditure in each year. Approximately 57 per cent of the total construction cost is expected in the *fabricated metal products* sector, and a further 22 per cent in the *construction* sector. The majority of expenditure will occur in the first and second year of the six-year construction period: 40 per cent in 2008-09 and 33 per cent in 2009-10.

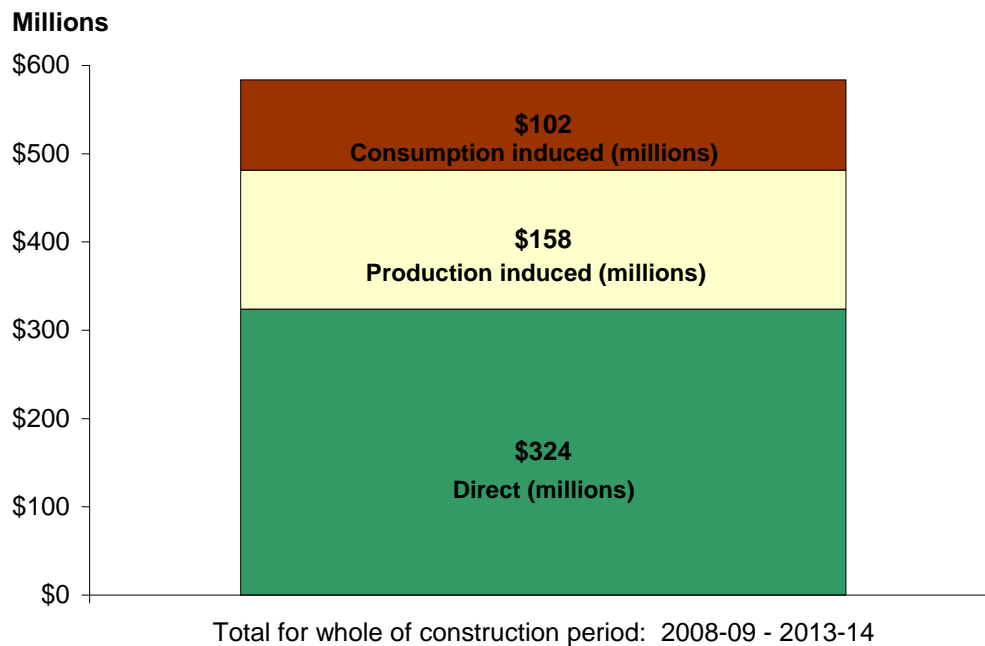
Table 2: Construction costs for the Moolarben Coal Project according to sector and year (EA2)

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	Whole of period	Prop'n of total
Agriculture, forestry and fishing	\$0.8	\$0.8	\$0.0	\$0.0	\$0.0	\$0.0	\$1.6	0.5%
Petroleum and coal products	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.1	\$0.6	0.2%
Non-metallic mineral products	\$0.8	\$0.8	\$0.0	\$0.0	\$0.0	\$0.0	\$1.6	0.5%
Basic iron and steel	\$1.5	\$1.5	\$0.0	\$0.0	\$0.0	\$0.0	\$3.0	0.9%
Fabricated metal products	\$70.0	\$69.0	\$16.8	\$5.0	\$15.0	\$10.0	\$185.8	57.3%
Transport equipment	\$2.4	\$3.0	\$0.5	\$0.2	\$1.0	\$1.0	\$8.1	2.5%
Machinery, rubber, plastic etc.	\$4.2	\$4.0	\$0.1	\$0.1	\$0.5	\$0.5	\$9.4	2.9%
Electricity, gas and water	\$7.0	\$3.0	\$0.1	\$0.1	\$0.1	\$0.1	\$10.4	3.2%
Construction	\$23.0	\$20.0	\$3.0	\$2.3	\$12.0	\$11.0	\$71.3	22.0%
Wholesale trade	\$0.5	\$0.5	\$0.1	\$0.1	\$0.1	\$0.1	\$1.4	0.4%
Accommodation and cafes	\$0.5	\$0.5	\$0.1	\$0.1	\$0.1	\$0.1	\$1.4	0.4%
Transport and storage	\$0.4	\$0.4	\$0.1	\$0.1	\$0.1	\$0.1	\$1.2	0.4%
Communication services	\$0.3	\$0.3	\$0.1	\$0.1	\$0.1	\$0.1	\$1.0	0.3%
Finance and insurance	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$1.0	\$6.0	1.9%
Property and business services	\$18.0	\$0.1	\$0.0	\$0.0	\$0.0	\$0.0	\$18.1	5.6%
Government admin./defence	\$0.5	\$1.0	\$1.0	\$0.2	\$0.2	\$0.2	\$3.1	1.0%
Total	\$131	\$106	\$23	\$9.4	\$30.3	\$24.3	\$324	100%
Proportion of total expenditure in each year	40%	33%	7%	3%	9%	8%	100%	

(ii) Output impacts

Total expenditure of \$324 million over the whole of the construction period is expected to stimulate additional production in the region valued at approximately \$158 million and additional consumption worth \$102 million: an induced benefit of \$260 million, providing a total benefit to the region valued at \$584 million (see Figure 1).

Figure 1: Value of output generated from construction of the Moolarben facilities (EA2)



Source: Hunter Valley Research Foundation, 2008

In the *fabricated metal products* sector alone, direct expenditure of \$186 million will induce further production and consumption worth \$137 million, a total benefit of \$323 million. In the *construction* sector, expenditure of \$71 million on the mining facilities will generate an additional \$70 million worth of production and consumption to yield a total benefit of \$141 million.

The top section of Table 3 (over) provides details of the value of the initial, direct expenditure in each sector of the regional economy, and the value of output induced in each sector as a result, over the whole of the six-year construction period. The approximate distribution of the total estimated impacts in each year of this period is shown in the lower section. These impacts will be greatest in the first and second years when construction expenditure is at its highest.

Table 3: Value of output generated from construction of the Moolarben facilities (EA2)

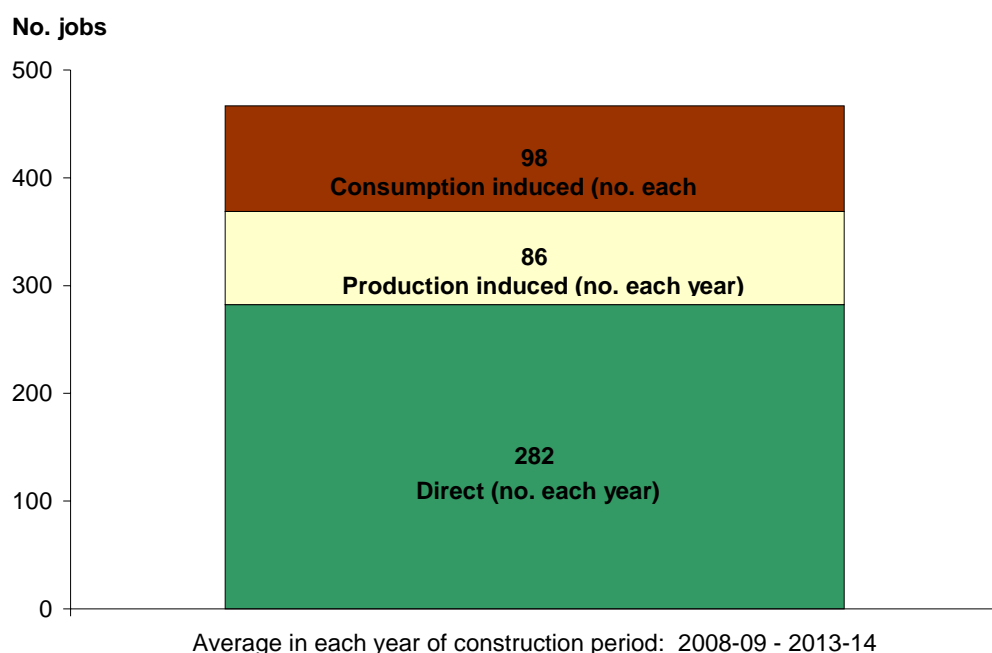
Output impacts over the whole of the construction period (\$ million)					
	Direct (i)	Induced		Total induced (iv)=(ii)+(iii)	Total (i)+(iv)
		Production induced (ii)	Consumption induced (iii)		
Agriculture, forestry and fishing	\$1.600	\$1.171	\$0.465	\$1.636	\$3.236
Petroleum and coal products	\$0.600	\$0.017	\$0.072	\$0.089	\$0.689
Non-metallic mineral products	\$1.600	\$1.280	\$0.426	\$1.706	\$3.306
Basic iron and steel	\$3.000	\$0.427	\$0.710	\$1.138	\$4.138
Fabricated metal products	\$185.801	\$84.791	\$52.167	\$136.958	\$322.759
Transport equipment	\$8.100	\$0.919	\$1.920	\$2.840	\$10.940
Machinery, rubber and plastic etc.	\$9.400	\$1.868	\$4.480	\$6.348	\$15.748
Electricity, gas and water	\$10.400	\$2.698	\$2.487	\$5.185	\$15.585
Construction	\$71.300	\$43.157	\$26.778	\$69.935	\$141.235
Wholesale trade	\$1.400	\$0.354	\$0.254	\$0.607	\$2.007
Accommodation, cafes, restaurants	\$1.400	\$0.639	\$0.504	\$1.143	\$2.543
Transport and storage	\$1.200	\$0.437	\$0.366	\$0.803	\$2.003
Communication services	\$1.000	\$0.065	\$0.149	\$0.214	\$1.214
Finance and insurance	\$6.000	\$2.400	\$1.714	\$4.113	\$10.113
Property and business services	\$18.100	\$15.740	\$7.630	\$23.371	\$41.471
Government admin. and defence	\$3.100	\$1.538	\$2.017	\$3.554	\$6.654
Total	\$324.001	\$157.503	\$102.138	\$259.640	\$583.641
Approximate distribution of the <u>total</u> impacts in each year of construction (\$ million)					
2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
\$235.978	\$190.944	\$41.431	\$16.933	\$54.581	\$43.773

In the 2006 assessment, construction expenditure of \$150 million was expected to stimulate additional production in the region valued at approximately \$73 million and additional consumption worth \$44 million: an induced benefit of \$117 million, providing a total benefit to the region valued at \$267 million. The output totalling \$584 million, expected to be generated in the region according to the EA2 estimates, is almost 2.2 times higher than the value estimated in 2006.

(iii) Employment impacts

Total construction expenditure of \$324 million is expected to directly create an average of 282 full-time equivalent jobs in each financial year during which construction proceeds. Additional production in the region will generate a further 87 jobs, and additional consumption will create a further 98 jobs: an induced benefit of 184 jobs, providing a total employment benefit to the region of 467 full-time equivalent positions, on average, in each year of the construction period (see Figure 2).

Figure 2: Employment generated from construction of the Moolarben facilities (EA2)
Average no. full-time equivalent jobs in each year



Source: Hunter Valley Research Foundation, 2008

The majority of jobs will result from direct expenditure in the *fabricated metal products* sector, with an average of 192 directly created and a further 91 induced by the additional production and consumption in the region, a total of 283 positions, on average, in each year. From direct expenditure in the *construction* sector, an average of 36 positions will be directly created, predominately onsite, with an additional 50 jobs generated by the induced production and consumption: a total of 86 jobs, on average, in each year of construction.

The top section of Table 4 (over) shows the accumulated number of full-time equivalent jobs generated from the initial, direct, expenditure on the mining facilities in each of the specified sectors over the whole of the six-year construction period. The middle section indicates the average number of jobs generated in each year, and the lower section shows the approximate distribution of the total estimated impacts in each year of the construction period. These impacts will be greatest in the first and second years when construction expenditure is at its highest.

Table 4: Employment generated from construction of the Moolarben facilities (EA2)

Employment impacts over the whole of the construction period					
Accumulated no. full-time jobs					
	Direct (i)	Induced		Total induced (iv)=(ii)+(iii)	Total (i)+(iv)
		Production induced (ii)	Consumption induced (iii)		
Agriculture, forestry and fishing	9	5	3	8	17
Petroleum and coal products	3	0	0	0	3
Non-metallic mineral products	3	3	2	6	9
Basic iron and steel	6	2	4	6	12
Fabricated metal products	1,152	252	300	551	1,703
Transport equipment	31	4	11	15	46
Machinery, rubber and plastic etc.	53	8	26	33	86
Electricity, gas and water	16	10	14	24	39
Construction	217	145	154	299	516
Wholesale trade	4	1	1	3	7
Accommodation, cafes and restaurants	14	2	3	5	19
Transport and storage	4	2	2	4	8
Communication services	2	0	1	1	3
Finance and insurance	9	24	10	33	43
Property and business services	150	54	44	98	248
Government admin. and defence	23	6	12	18	40
Total	1,694	519	587	1,106	2,800
Average no. full-time jobs*					
Average in each year of the construction period	282	87	98	184	467
Approximate distribution of the <u>total</u> impacts in each year of construction* (no. full-time jobs in each year)					
2008-09	2008-09	2008-09	2008-09	2008-09	2008-09
1,132	916	199	81	262	210

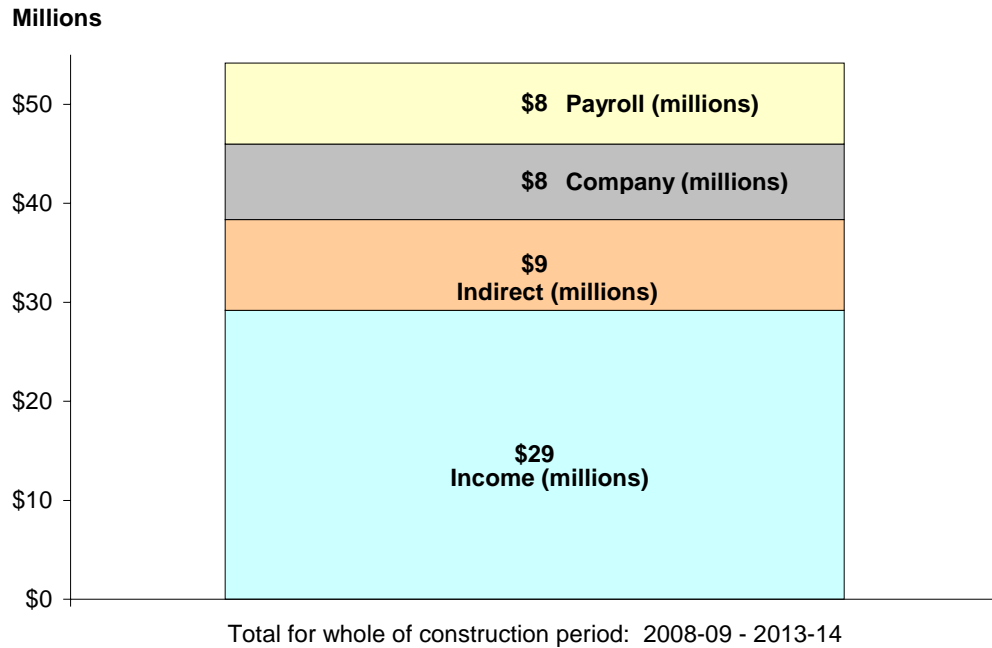
* Note: since it is assumed that each full-time equivalent job created lasts for one year, the period average and the annual distribution of employment are the most relevant indicators of employment generation in the region.

In the 2006 assessment, construction expenditure of \$150 million was expected to directly create 222 full-time equivalent jobs in each year of the two-year construction period, with the induced production and consumption in the region each generating a further 108 jobs: an induced benefit of 216 jobs, providing a total employment benefit to the region of 438 full-time equivalent positions in each year, with an accumulated benefit of 876 jobs. The accumulated benefit of 2,800 jobs according to the EA2 estimates is more than three times higher than estimated in 2006 as a result of the higher construction spend over a longer period, as well as a higher multiplier in the current HVRF IO model for the *fabricated metal products* sector.

(iv) Federal and State Government taxation revenues

Over the whole of the construction period it is estimated that taxation revenue to the Federal Government will total almost \$46 million: \$29 million from income tax, \$9 million from indirect taxes and \$8 million from company tax. Payroll taxation revenue to the State Government is estimated at more than \$8 million, yielding a total public sector benefit of more than \$54 million (see Figure 3).

Figure 3: Value of taxation revenues generated from construction of the Moolarben facilities (EA2)



Source: Hunter Valley Research Foundation, 2008

The top section of Table 5 (over) details estimates of the total revenue that will accrue to the Federal and State Governments as a result of the direct and induced output and employment generated from expenditure on the mining facilities in each of the specified sectors, over the whole of the six-year construction period. The approximate distribution of the total estimated revenue in each year of this period is shown in the lower section.

Table 5: Taxation revenues generated from construction of the Moolarben facilities (EA2)

Taxation revenues in each year of the construction period (\$ million)						
	Federal			Total Federal (iv) = (i)+(ii)+(iii)	State Payroll (v)	Total Federal and State (iv)+(v)
	Income (i)	Indirect (ii)	Company (iii)			
Agriculture, forestry and fishing	\$0.133	\$0.042	\$0.042	\$0.217	\$0.037	\$0.254
Mining	\$0.021	\$0.006	\$0.009	\$0.036	\$0.006	\$0.042
Chemical products	\$0.122	\$0.038	\$0.043	\$0.203	\$0.034	\$0.237
Non-metallic mineral products	\$0.203	\$0.064	\$0.054	\$0.321	\$0.057	\$0.378
Basic iron and steel	\$14.901	\$4.695	\$4.211	\$23.807	\$4.172	\$27.979
Fabricated metal products	\$0.548	\$0.173	\$0.143	\$0.864	\$0.154	\$1.018
Transport equipment	\$1.280	\$0.403	\$0.205	\$1.888	\$0.358	\$2.247
Machinery, rubber and plastic etc.	\$0.710	\$0.224	\$0.203	\$1.137	\$0.199	\$1.336
Electricity, gas and water	\$7.649	\$2.410	\$1.843	\$11.901	\$2.142	\$14.043
Construction	\$0.072	\$0.023	\$0.026	\$0.121	\$0.020	\$0.142
Wholesale trade	\$0.144	\$0.045	\$0.033	\$0.222	\$0.040	\$0.263
Transport and storage	\$0.105	\$0.033	\$0.026	\$0.164	\$0.029	\$0.193
Communication services	\$0.043	\$0.013	\$0.016	\$0.072	\$0.012	\$0.084
Finance and insurance	\$0.490	\$0.154	\$0.132	\$0.776	\$0.137	\$0.913
Property and business services	\$2.180	\$0.687	\$0.541	\$3.407	\$0.610	\$4.018
Government admin. and defence	\$0.576	\$0.181	\$0.087	\$0.844	\$0.161	\$1.006
Total	\$29.174	\$9.192	\$7.615	\$45.981	\$8.169	\$54.150
Approximate distribution of <u>total</u> taxation revenues in each year of the construction period (\$ million)						
2008-09	2008-09	2008-09	2008-09	2008-09	2008-09	2008-09
\$21.89	\$17.72	\$3.84	\$1.57	\$5.06	\$4.06	\$21.89

In the 2006 assessment, it was estimated that taxation revenue to the Federal Government would total approximately \$19 million: \$11 million from income tax, \$4 million from indirect taxes and \$3 million from company tax. Payroll taxation revenue to the State Government was estimated at approximately \$3 million, yielding a total public sector benefit of close to \$22 million. The total value of taxation revenue of \$54 million expected to be generated according to the EA2 estimates is 2.8 times higher than estimated in 2006.

2.4 Operational impacts

(i) Coal production

Output and employment impacts resulting from the ongoing operation of the Moolarben Coal Project will be directly generated in the *mining* sector of the I-O model. Production is expected to commence in early 2010, with output from Open Cut No.1 mine. Production will be expanded progressively until 2016-17 (Year 8) when open cut and underground mining will be at full production. Maximum production is expected to be maintained for a further 14 years, until 2030-31. Consequently, the regional economic benefits specified for 2016-17 will be maintained in each year of the maximum production period. They will decline thereafter in proportion to the reduction in output, and will be extinguished with the end of the economic life of the facility, estimated to be around 2038-39. The production schedule is summarised below in Table 6 and detailed in the Appendix.

Table 6: Production schedule for the Moolarben Coal Project (EA2)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8 to Year 23
	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17 - 2030-31
Tonnage (million tonnes)								
Open cut	5.3	8.3	8.6	9.0	9.0	9.0	9.0	9.4
Underground	0	0	0	0	0.5	3.6	3.6	3.6
Total	5.3	8.3	8.6	9.0	9.5	12.6	12.6	13.0
Value (\$ million)								
Total	\$315	\$495	\$517	\$540	\$570	\$756	\$756	\$780
Employment (full-time equivalent)								
Total	130	200	250	250	300	400	439	439
Royalty payments (\$ million)								
6% value prod'n	\$18.90	\$29.70	\$31.03	\$32.40	\$34.20	\$45.36	\$45.36	\$46.80
	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
	2031-32	2032-33	2033-34	2034-35	2035-36	2036-37	2037-38	2038-39
Tonnage (million tonnes)								
Open cut	8.3	7.8	0.8	0.2	0	0	0	0
Underground	3.6	3.6	3.4	2.7	2.9	2.9	3.1	1.6
Total	11.9	11.4	4.1	3.0	2.9	2.9	3.1	1.6
Value (\$ million)								
Total	\$711	\$683	\$248	\$177	\$174	\$172	\$187	\$96
Employment (full-time equivalent)								
Appropriate employment levels will be determined at the time								
Royalty payments (\$ million)								
6% value prod'n	\$42.66	\$41.00	\$14.88	\$10.64	\$10.44	\$10.29	\$11.19	\$5.77

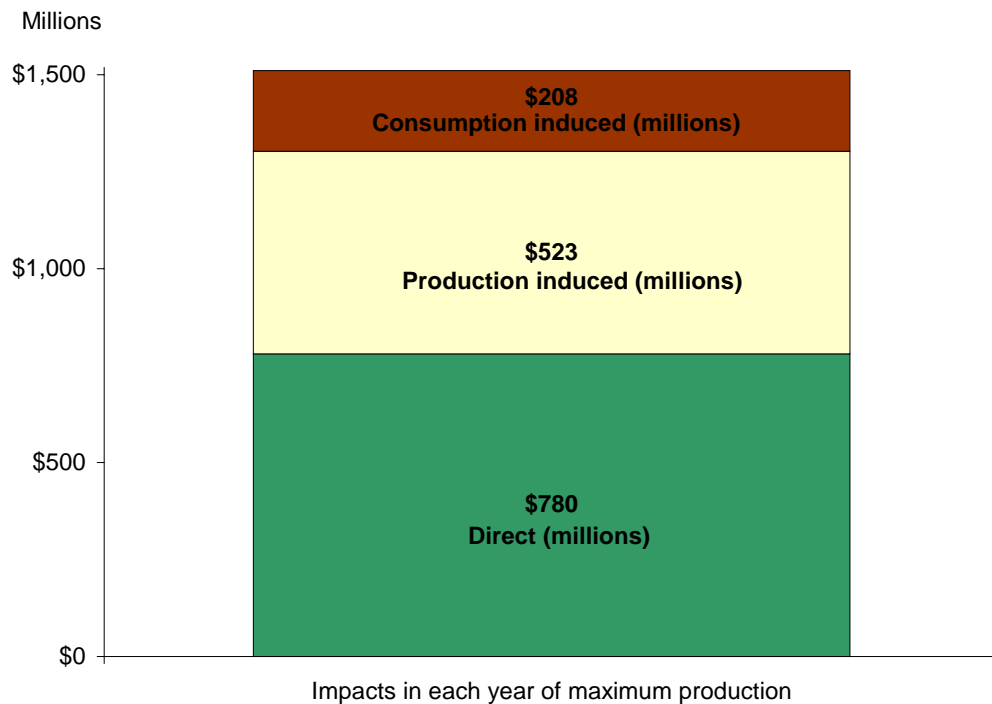
Note:

- (i) The value of output is assumed to average \$60 per tonne in each year of the production period.
- (ii) Saleable production (shown above) is estimated at approximately 75 per cent of gross (rate of mine) production from open cut mines and 90 per cent of gross production from underground mines. Rate of mine production is shown in the Appendix.

(ii) Output impacts

When production revenue is maximised at \$780 million per annum in the eighth year of operation, the coal mining activities will stimulate further output in the region valued at approximately \$731 million: \$523 million from additional production and \$208 million from additional consumption. The total output impact in each year of maximum production is expected to be valued at more than \$1.5 billion (see Figure 4).

Figure 4: Value of output generated in each year of maximum production from the Moolarben Coal Project (EA2)



Source: Hunter Valley Research Foundation, 2008

Table 7 (over) presents estimates of the value of output in each financial year, generated directly from the Moolarben mines as output is progressively increased to full capacity in the seventh year of operation. Also shown is the value of additional production and consumption induced throughout the regional economy as a consequence of the mining operations.

Table 7: Value of output generated in each year from operation of the Moolarben Coal Project (EA2)
\$ million

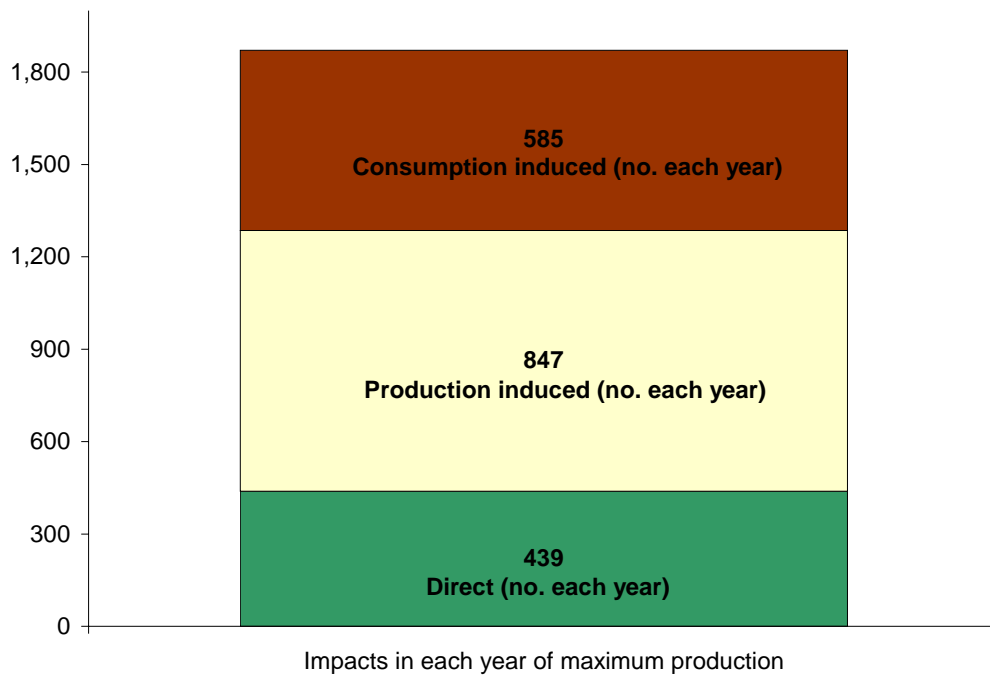
	Direct (mining sector) (i)	Induced		Total induced (iv) = (ii)+(iii)	Total (i)+(iv)
		Production induced (ii)	Consumption induced (iii)		
Year 1 (2009-10; 5.3 million tonnes produced)	\$315.000	\$211.073	\$84.139	\$295.212	\$610.212
Year 2 (2010-11; 8.3 million tonnes produced)	\$495.000	\$331.686	\$132.218	\$463.904	\$958.904
Year 3 (2011-12; 8.6 million tonnes produced)	\$517.000	\$346.428	\$138.094	\$484.522	\$1,001.522
Year 4 (2012-13; 9 million tonnes produced)	\$540.000	\$361.840	\$144.238	\$506.078	\$1,046.078
Year 5 (2013-14; 9.5 million tonnes produced)	\$570.000	\$381.942	\$152.251	\$534.193	\$1,104.193
Year 6 (2014-15; 12.6 million tonnes produced)	\$756.000	\$506.575	\$201.933	\$708.509	\$1,464.509
Year 7 (2015-16; 12.6 million tonnes produced)	\$756.000	\$506.575	\$201.933	\$708.509	\$1,464.509
Year 8 (2015-16; 13 million tonnes produced) and following years of maximum output	\$780.000	\$522.657	\$208.344	\$731.001	\$1,511.001

Under the production/value-of-coal scenario considered for the 2006 assessment, maximum revenue of \$356 million per annum in the fourth year of operation was estimated to stimulate further output in the region valued at approximately \$308 million: \$162 million from additional production and \$146 million from additional consumption, providing a total annual output impact of approximately \$664 million. The revised estimates indicate a more than doubling of the expected regional output benefits from the operation of the Moolarben Coal Project, mainly as a result of the stimulus provided to regional production.

(iii) Employment impacts

When production is maximised in the eighth year of operation, direct annual employment at the mining operations will be equivalent to around 439 full-time positions. Additional production and consumption in the region will generate a further 847 and 585 jobs respectively: an induced employment benefit of 1,432 jobs. In total, approximately 1,871 full-time equivalent positions will be created in the region in each year of maximum production (see Figure 5).

Figure 5: Employment generated in each year of maximum production from the Moolarben Coal Project (EA2)
No. full-time jobs in each year



Source: Hunter Valley Research Foundation, 2008

Table 8 (over) presents estimates of the employment in each financial year, generated directly from the Moolarben mines as output is progressively increased to full capacity in the seventh year of operation. Also shown is the number of jobs created from additional production and consumption induced throughout the regional economy as a consequence of the mining operations.

Table 8: Employment generated in each year from operation of the Moolarben Coal Project (EA2)
No. full-time jobs in each year

	Direct (mining sector) (i)	Induced		Total induced (iv) = (ii)+(iii)	Total (i)+(iv)
		Production induced (ii)	Consumption induced (iii)		
Year 1 (2009-10; 5.3 million tonnes produced)	130	251	173	424	554
Year 2 (2010-11; 8.3 million tonnes produced)	200	386	267	652	852
Year 3 (2011-12; 8.6 million tonnes produced)	250	482	333	815	1,065
Year 4 (2012-13; 9 million tonnes produced)	250	482	333	815	1,065
Year 5 (2013-14; 9.5 million tonnes produced)	300	579	400	979	1,279
Year 6 (2014-15; 12.6 million tonnes produced)	400	771	533	1,305	1,705
Year 7 (2015-16; 12.6 million tonnes produced)	439	847	585	1,432	1,871
Year 8 (2015-16; 13 million tonnes produced) and following years of maximum output	439	847	585	1,432	1,871

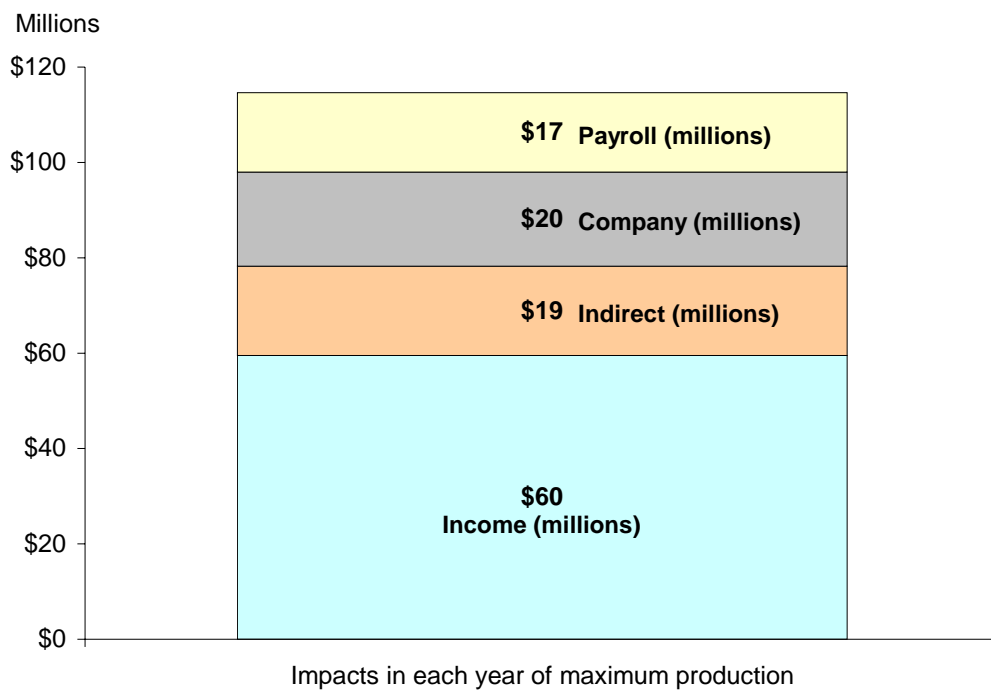
Note: employment is maximised in Year 7, one year in advance of maximum production. The total of 439 employees at the mining facilities will be comprised of 240 in the open cut mines, 162 in the underground mines, 32 in the coal preparation facilities and 5 in administrative positions.

Under the production/value-of-coal scenario considered for the 2006 assessment, maximum employment at the mining operations was expected in the eleventh year of operation, equivalent to around 317 full-time positions. Additional production and consumption in the region was expected to generate a further 280 and 313 jobs respectively: an induced employment benefit of 593 jobs, with a total of approximately 910 full-time equivalent positions created annually in the region from Year 11. The revised estimates indicate a more than doubling of the expected regional employment benefits from the operation of the Moolarben Coal Project, mainly as a result of the stimulus provided to regional production.

(iv) Federal and State Government taxation revenues

When production and employment are maximised in the eighth year of operation, Federal Government taxation receipts are estimated to total approximately \$98 million: \$60 million from income tax, \$19 million from indirect taxes, and \$20 million from company tax. Payroll taxation revenue to the State Government is estimated at close to \$17 million, yielding a total public sector benefit of almost \$115 million in each financial year of maximum production (see Figure 6).

Figure 6: Value of taxation revenues generated in each year of maximum production from the Moolarben Coal Project (EA2)



Source: Hunter Valley Research Foundation, 2008

Table 9 (over) details estimates of revenues that will accrue to the Federal and State Governments as a result of the direct and induced output and employment generated in each financial year of the mining operations.

Table 9: Value of taxation revenues generated in each financial year from operation of the Moolarben Coal Project (EA2)
\$ million

	Federal			Total Federal (iv) = (i)+(ii)+(iii)	State Payroll (v)	Total Federal and State (iv)+(v)
	Income (i)	Indirect (ii)	Company (iii)			
Year 1 (2009-10; 5.3 million tonnes produced)	\$24.033	\$7.572	\$7.962	\$39.567	\$6.729	\$46.296
Year 2 (2010-11; 8.3 million tonnes produced)	\$37.766	\$11.900	\$12.511	\$62.177	\$10.574	\$72.751
Year 3 (2011-12; 8.6 million tonnes produced)	\$39.444	\$12.429	\$13.067	\$64.940	\$11.044	\$75.985
Year 4 (2012-13; 9 million tonnes produced)	\$41.199	\$12.981	\$13.649	\$67.829	\$11.536	\$79.365
Year 5 (2013-14; 9.5 million tonnes produced)	\$43.488	\$13.703	\$14.407	\$71.598	\$12.177	\$83.774
Year 6 (2014-15; 12.6 million tonnes produced)	\$57.679	\$18.174	\$19.108	\$94.961	\$16.150	\$111.111
Year 7 (2015-16; 12.6 million tonnes produced)	\$57.679	\$18.174	\$19.108	\$94.961	\$16.150	\$111.111
Year 8 (2015-16; 13 million tonnes produced) and following years of maximum output	\$59.510	\$18.751	\$19.715	\$97.976	\$16.663	\$114.638

Under the production/value-of-coal scenario considered for the 2006 assessment, maximum production and taxation revenues were expected in the fourth year of operation. Federal Government taxation receipts were estimated to total approximately \$59 million: \$37 million from income tax, \$13 million from indirect taxes, and \$9 million from company tax. Payroll taxation revenue to the State Government was estimated at approximately \$10 million, yielding a total public sector benefit \$69 million in each year of maximum production. The revised estimates indicate a 55 per cent increase in the expected total taxation revenues for the Federal and State Governments from the operation of the Moolarben Coal Project.

(v) Other State Government revenue

Other revenues from the mining operations will accrue to the State Government based upon the tonnage of output in each year. These include rail freight charges, port charges, royalties and other taxes. The estimated value of royalties follows. No estimates have been made for the revenue derived from other sources.

Royalty payments have been estimated on the basis of 6 per cent of the value of production. They will increase progressively from approximately \$19 million during the first year of output, to \$47 million per annum when output is maximised in the eighth financial year of operation (see Table 6, page 12). They will decline progressively in the final eight years of production.

It is estimated that a total of \$1,086 million will be paid in production royalties to the State Government over the 30 years between 2009-10 and 2038-39.

Under the production/value-of-coal scenario considered for the 2006 assessment, production royalties were expected to total \$341 million over the expected 14 year production period. Revised estimates for the EA2 operations suggest an approximate three-fold increase in royalty revenues.

Appendix:
Production schedule



Open cut production schedule: Year 1 (2009-10) to Year 26 (2034-35) – rate of mine production

Year	Overburden from O/C1 bcm	O/C1 Coal mined tonnes	Overburden from O/C2 bcm	O/C2 Coal mined tonnes	Overburden from O/C4 bcm	O/C4 Coal mined tonnes	O/C3 Coal mined tonnes	O/C Total tonnes
1: 2009-10	4,175,000	7,000,000			12,525,000			up to 7,000,000
2: 2010-11	8,350,000	7,000,000			8,350,000	4,000,000		up to 12,000,000
3: 2011-12	8,350,000	7,000,000			16,700,000	4,500,000		up to 12,000,000
4: 2012-13	16,700,000	7,500,000			16,700,000	4,500,000		up to 12,000,000
5: 2013-14	16,700,000	8,000,000			16,700,000	4,000,000		up to 12,000,000
6: 2014-15	14,515,570	5,500,000	2,184,430		16,700,000	6,500,000		up to 12,000,000
7: 2015-16		27,853	16,700,000	7,972,147	16,700,000	4,000,000		up to 12,000,000
8: 2016-17			6,984,373	8,000,000	16,700,000	4,000,000	1,000,000	up to 13,000,000
9: 2017-18				721,718	29,225,000	11,278,282	1,000,000	up to 13,000,000
10: 2018-19					33,400,000	12,000,000	1,000,000	up to 13,000,000
11: 2019-20					33,400,000	12,000,000	1,000,000	up to 13,000,000
12: 2020-21					33,400,000	12,000,000	1,000,000	up to 13,000,000
13: 2021-22					33,400,000	12,000,000	1,000,000	up to 13,000,000
14: 2022-23					33,400,000	12,000,000	1,000,000	up to 13,000,000
15: 2023-24					41,750,000	12,000,000	1,000,000	up to 13,000,000
16: 2024-25					50,100,000	12,000,000	1,000,000	up to 13,000,000
17: 2025-26					50,100,000	12,000,000	1,000,000	up to 13,000,000
18: 2026-27					41,750,000	12,000,000	1,000,000	up to 13,000,000
19: 2027-28					41,750,000	12,000,000	1,000,000	up to 13,000,000
20: 2028-29					41,750,000	12,000,000	1,000,000	up to 13,000,000
21: 2029-30					41,750,000	12,000,000	1,000,000	up to 13,000,000
22: 2030-31					41,750,000	11,500,000	1,000,000	up to 13,000,000
23: 2031-32					41,750,000	10,000,000	1,000,000	up to 13,000,000
24: 2032-33					34,840,487	9,383,978	1,000,000	up to 13,000,000
25: 2033-34							1,000,000	up to 8,000,000
26: 2034-35							300,000	up to 8,000,000
27: 2035-36								
28: 2036-37								
29: 2037-38								
30: 2038-39								
Total	73,383,070	42,027,853	25,868,803	16,693,865	744,590,487	217,662,260	18,300,000	294,683,978

Underground and combined mines production schedule: Year 1 (2009-10) to Year 30 (2038-39)

Year	U/G1 Development tonnes	U/G1 Longwall tonnes	U/G2 Development tonnes	U/G2 Longwall tonnes	U/G4 Development tonnes	U/G4 Longwall tonnes	U/G Total tonnes	Combined rate of mine tonnes
1: 2009-10								up to 7,000,000
2: 2010-11								up to 12,000,000
3: 2011-12								up to 12,000,000
4: 2012-13								up to 12,000,000
5: 2013-14	342,221						500,000	up to 12,500,000
6: 2014-15	305,308	2,067,949					up to 4,000,000	up to 16,000,000
7: 2015-16	230,358	3,147,072					up to 4,000,000	up to 16,000,000
8: 2016-17	148,486	3,086,367					up to 4,000,000	up to 17,000,000
9: 2017-18	233,341	3,086,244					up to 4,000,000	up to 17,000,000
10: 2018-19	172,103	3,061,563	153,010				up to 4,000,000	up to 17,000,000
11: 2019-20	138,394	2,488,395	176,699				up to 4,000,000	up to 17,000,000
12: 2020-21	124,587	3,033,745	183,696				up to 4,000,000	up to 17,000,000
13: 2021-22		3,077,008	139,312				up to 4,000,000	up to 17,000,000
14: 2022-23		53,801	177,929	2,121,742			up to 4,000,000	up to 17,000,000
15: 2023-24			136,069	2,891,961			up to 4,000,000	up to 17,000,000
16: 2024-25			39,183	2,212,800			up to 4,000,000	up to 17,000,000
17: 2025-26				2,004,321	330,176		up to 4,000,000	up to 17,000,000
18: 2026-27					324,178	2,389,962	up to 4,000,000	up to 17,000,000
19: 2027-28					330,518	3,499,973	up to 4,000,000	up to 17,000,000
20: 2028-29					298,947	3,568,272	up to 4,000,000	up to 17,000,000
21: 2029-30					156,583	3,443,007	up to 4,000,000	up to 17,000,000
22: 2030-31					175,420	3,336,407	up to 4,000,000	up to 17,000,000
23: 2031-32					176,499	3,555,531	up to 4,000,000	up to 17,000,000
24: 2032-33					191,115	3,630,202	up to 4,000,000	up to 17,000,000
25: 2033-34					293,660	3,465,330	up to 4,000,000	up to 17,000,000
26: 2034-35					325,672	2,707,325	up to 4,000,000	up to 12,000,000
27: 2035-36					292,143	2,930,451	up to 4,000,000	up to 4,000,000
28: 2036-37					147,805	3,285,675	up to 4,000,000	up to 4,000,000
29: 2037-38						3,454,528	up to 4,000,000	up to 4,000,000
30: 2038-39						1,781,980	up to 4,000,000	up to 4,000,000
Total	1,694,798	23,102,144	1,005,898	9,230,824	3,042,716	41,048,643	79,125,023	373,809,001

