

20 Economics

20.1 Assessment objectives

The DGRs for the Cobbora Coal Project identified specific requirements to assess socio-economic issues associated with the Project, including:

- Potential direct and indirect economic benefits of the project for local and regional communities and the State;
- Potential impacts on local and regional communities, including:
 - Increased demand from local and regional infrastructure and services (such as housing, childcare, health, education and emergency services); and
 - Impacts on social amenity;
- A detailed description of the measures that would be implemented to minimise the adverse social and economic impacts of the project, including any infrastructure improvements or contributions and/or voluntary planning agreements or similar mechanism; and
- A detailed assessment of the costs and benefits of the development as a whole, and whether it would result in a net benefit for the NSW community.

The 'impacts on social amenity' are reported separately in Chapter 21 and Appendix S 'Social assessment'.

20.2 Assessment method

The economic assessment for the Project was prepared by Gillespie Economics (Appendix R) and the results are summarised in this chapter. The assessment was in accordance with the following guidance document as specified in the DGRs for the Project:

- *Draft Economic Evaluation in Environmental Impact Assessment* (DoP 2002).

Two economic aspects of the Project have been considered:

- the economic efficiency of the Project (ie consideration of costs and benefits), which was evaluated using benefit cost analysis (BCA); and
- the regional economic impacts of the Project (ie the economic activity that the Project will provide to the local, regional and state economies).

The draft *Economic Evaluation in Environmental Impact Assessment* (DoP 2002) guidelines ('the draft guidelines') identify economic efficiency as the key consideration of economic analysis. The draft guidelines identify BCA as essential for a proper economic evaluation of proposed developments that are likely to have significant environmental impacts. A consideration of the economic efficiency of the Project based on a BCA is provided in the following sections.

The draft guidelines indicate that regional economic impact assessments may provide more information as an adjunct to the economic efficiency analysis. Economic stimulus to the local economy can be estimated using input-output modelling of the regional economy, as considered in Section 20.3.2.

20.2.1 Economic efficiency

For a project to be economically desirable, it must be more economically efficient (or beneficial) than a no-project scenario. A project is more economically efficient than having no project if the benefits to society exceed the costs. For mining projects, the main benefit is the producer surplus (net production benefits) generated, while the main costs are any adverse environmental, social and cultural impacts.

In accordance with the draft guidelines, the following steps were used to assess the Project's benefits and costs:

- identify the no-project scenario;
- define the Project and its implications (ie benefits and costs);
- value the incremental benefits and costs;
- consolidate value estimates using discounting to account for temporal effects over the Project's life;
- apply decision criteria;
- consider non-quantified benefits and costs; and
- determine overall outcome, ie comparison of total benefits and total costs.

The BCA is based on financial, technical and environmental information reported in this EA. BCA has to identify a no-project scenario for a comparative measurement of the benefits and costs of the project. For the Project, the no-project scenario would continue existing agricultural and other land uses of the PAA. As discussed in Chapter 9 'Soils and agriculture', the majority of the PAA is Agricultural Suitability Class 3 (14,677 ha), described as "moderately productive lands suited to improved pasture and to cropping within a pasture rotation". The assessment identifies that agricultural enterprises in the PAA can generate a gross margin of around \$12 million a year, of this around \$2 million (17%) could be generated on land in the proposed disturbance area.

The Project is primarily being developed to supply 9.5 Mtpa of coal to domestic power stations and up to 2.5 Mtpa of coal for spot domestic or export sales. At this stage, the distribution between domestic and export sales is unknown but, for this assessment, it is assumed that up to 2.5 Mtpa of coal will be exported. At the end of the 21 year mine life, it is assumed the residual value of capital equipment and land would be realised through sale or alternative use.

Alternatives for the Project have been considered (see Section 3.21). However, the current Project is considered to be the most feasible combination of minimising environmental and social impacts while achieving satisfactory resource recovery and operational efficiency. Consequently, the BCA focuses on CHC's current Project, compared with the no-project scenario described above.

20.3 Impact assessment

20.3.1 Benefit cost analysis

As part of the BCA, the actual incremental benefits and costs of the Project have been identified and an assumed monetary value applied. Where competitive market prices are available, they have generally been used as an indicator of economic values, in accordance with the *NSW Treasury Guidelines for Economic Appraisal* (NSW Treasury 2007). This was the case for all production costs and benefits, including opportunity cost of land and plant, capital operating costs, revenues, decommissioning cost and residual values. Where market prices were not available, a number of techniques were used as described below.

The accepted main decision criterion for assessing the economic desirability of a project to society is its net present value (NPV). NPV is the present value of benefits less the present value of costs. A positive NPV indicates it would be desirable from an economic perspective for society to allocate resources to a project, because the community as a whole would benefit. The total NPV for the Project is considered in Section 20.3.1 (iii) following an assessment of the Project's benefits and costs.

The NSW Treasury's recommended annual discount rate of 7% has been applied to the costs for a comparison over the Project life.

i Benefits

The following sections provide an assessment of the Project's economic and employment benefits.

a. Value of coal

The value of coal to be mined is estimated at \$6,382 million, which is based on the world price of coal but is adjusted for the lower energy value of the Project's thermal coal. A conservative economic value of \$77/t free-on-board has been assumed. As this value is for washed coal delivered to port, the economic value of coal free-on-rail, ie the cost for coal-fired power generators, is taken as the world price for thermal coal adjusted for delivery costs to port. There is some uncertainty around the future value of coal and therefore variations in the assumed economic value of coal from the Project have been allowed for.

b. Residual value at end of the evaluation period

At the end of the Project, capital equipment, land (excluding environmental offsets) and water assets will have residual value that will be realised by sale or alternative use. CHC estimated the residual value to be \$224 million.

c. Employment

The mine operation workforce is estimated to rise to 300 during the first two years of operation. It will increase steadily over the following 10 years to a peak of around 590. The value of employment provided over the Project's life is conservatively estimated at \$192 million (Appendix R 'Economic assessment'). Additional employment benefits associated with the wider regional economy are considered in Section 20.3.2.

d. Infrastructure

The Project provides improvements for a wide range of local infrastructure that will benefit the local community both during operation and post-mining. The following infrastructure will be available to the public and available in the long term: road and intersection upgrades, augmented local electricity supply, water supply pipeline, mobile telephone tower, and upgraded regional rail network. The economic benefits of the improvements will be in addition to those benefits modelled.

e. Improved local work place skills

It is expected that 50% of the operation's workforce will be recruited locally. All of them will be trained to meet the mine's specific operating practices and many will receive substantial training, including certified operator, trade and similar courses. The result will be that the skill levels and employability of local workers will increase, meaning greater employment opportunities will be available for these workers even when the mine ceases to operate. Particular groups that will benefit include local unemployed youths and Aboriginal people. Again, the economic benefits will be in addition to those benefits modelled.

ii Costs

All economic and non-market costs of the Project are considered in Table 20.1. An assumed monetary value has been applied to each Project cost, unless it is deemed the impact of the potential cost (eg noise or dust impacts) will be mitigated to the extent where individual or community wellbeing would not be greatly affected. The main costs are considered in the following section, the subsidiary costs are listed in Table 20.1.

a. Cost of land

There is an opportunity cost associated with using the land CHC owns for mining instead of its next best use (eg agricultural production). An indication of the opportunity cost of the land can be gained from the land's current market value, estimated at \$90 million, which reflects the NPV of agricultural production.

b. Cost of water

CHC has secured high-security water licences from sellers within the Macquarie and Cudgegong Regulated River Systems (See Chapter 8 'Surface water'). The opportunity cost of water is conservatively estimated at \$7 million.

c. Capital cost of the Project

The Project's capital costs are for capital equipment, mine development, the CHPP, the rail spur line, the water supply pipeline, water pumping stations, access roads and powerlines; associated minor infrastructure; land acquisitions for properties within the disturbance area, properties impacted by noise, dust or visual impacts; and for properties to deliver biodiversity offsets. These capital costs over the life of the Project are estimated by CHC at \$1,900 million.

d. Annual operating cost of the mine

The Project's annual operating costs include those associated with mining, progressive rehabilitation, environmental management and monitoring, coal processing, administration and coal transport. The Project's average annual operating costs (excluding royalties) are estimated at \$392 million. In addition, it is estimated the Project will generate total royalties over its life of around \$407 million, or \$158 million in present value terms.

e. Decommissioning and rehabilitation costs

Mined areas will be progressively rehabilitated. At the end of the Project, the on-site infrastructure will be decommissioned and the areas affected rehabilitated. These latter costs are estimated at \$69 million (\$13 million in present value terms). Progressive rehabilitation costs are included in the Project's operating costs.

f. Greenhouse gases

The Project is predicted to generate a total of about 4.5 Mt of Scope 1 greenhouse gas emissions, 3.2 Mt of Scope 2 greenhouse gas emissions, 7.4 Mt of Scope 3 emissions (excluding emissions associated with combusting the coal). To place an economic value on carbon dioxide equivalent (CO₂-e) emissions, a shadow price of CO₂-e is required that reflects its social costs. For this analysis, a conservative shadow price of \$30/t CO₂-e was used, with sensitivity testing from \$8/t CO₂-e to \$40/t CO₂-e.

g. Aboriginal heritage

Choice modelling studies that survey a cross-section of NSW households to estimate the amount that would be paid to avoid a range of environmental and social impacts have found the wellbeing of the broader community is reduced when highly significant Aboriginal heritage sites are disturbed by mining projects (Gillespie Economics 2008, 2009a, 2009b). Four sites of high significance (see Chapter 18 'Aboriginal heritage') would be affected by the Project. Using benefit transfer from Gillespie Economics (2008, 2009a, 2009b) these impacts are estimated at between \$21 million and \$133 million, with average impacts across studies of \$59 million.

iii Results of the BCA

The results of the BCA (Table 20.1) show the Project will have a net production benefit of \$2,014 million, which is based solely on the production benefits (ie value of coal, capital and land) and costs (ie land, establishment, operating and decommissioning/rehabilitation costs).

The monetary value of the external costs of the Project, which include the environmental and social costs (ie greenhouse gas, Aboriginal heritage impacts), is estimated at \$68 million; the external benefits (ie economic and social benefits of employment) are estimated at \$192 million.

Overall the BCA results indicate that the Project is estimated to have an NPV of \$2,136 million and is therefore desirable and justified from an economic perspective.

Table 20.1 **Benefit cost analysis results of the Project (present values at 7% discount rate)**

	Costs	\$M	Benefits	\$M
Production	Opportunity cost of land and water	\$90	Value of coal	\$6,382
	Capital costs of establishment and construction	\$1,096	Residual value of capital and land	\$40
	Operating costs	\$3,209		
	Decommissioning and rehabilitation	\$13		
	Production sub-total	\$4,408		\$6,422
	Net production benefits	-		\$2,014
Externalities	Greenhouse gas emissions (refer Section 15.4)	\$184 (2)	Economic and social benefits of employment	\$192
	Aboriginal heritage (refer Section 18.4)	\$59		
	Agricultural production – the present value of foregone agricultural production is included in the opportunity cost of land.	-		
	Operational noise – owners of the properties that are predicted to be impacted by noise (see Chapter 16 ‘Noise’) have been, or will be, given the opportunity to be acquired by CHC. Acquisition costs have been incorporated into the Project’s capital costs, and where land has already been acquired, into the opportunity cost of the land.	-		
	Rail transport noise – off-site train movements on the main line are predicted to satisfy the relevant daytime noise criteria. The night-time criteria will be satisfied at all but two receptors and noise mitigation measures will be provided at these affected residences and are allowed for in the capital costs. Consequently, no economic effects with respect to rail noise from the Project have been included in the BCA.	-		
	Blast overpressure and vibration – No overpressure or vibration impacts to private residences are predicated and therefore no economic effects have been identified in the BCA.	-		
	Air quality – owners of properties affected by exceedences to air quality criteria have or will be given the opportunity to be acquired by CHC. Acquisition costs have been incorporated into the capital costs, and where land has already been acquired, into the opportunity cost of land.	-		

Table 20.1 **Benefit cost analysis results of the Project (present values at 7% discount rate) (Cont'd)**

Costs	\$M	Benefits	\$M
Surface water – no significant Project-related impacts on surface water are likely to occur, therefore no economic effects have been identified in the BCA.			
Groundwater – bores CHC owns that will be affected by drawdown have been included as an opportunity cost of land. Mitigation strategies for a private affected landowner include property purchase or options such as a replacement bore. These costs have been included in the Project's operating costs.	-		
Ecology – impacts to ecology have been minimised through planning and design measures that are included in the Project's capital and operating costs. Implementation of the offset strategy will ensure a net gain for biodiversity values within the region, which has been included in the capital cost.	-		
Road transport – road and intersection improvements will be required along with complementary measures, including driver training for employees and safety audits, which have been included in the Project's capital costs.	-		
Rail – a range of identified network improvements to improve freight train capacity have been identified to meet increased demand. These costs are reflected in the rail user charges that are included in the estimate of net production benefits.	-		
Historic heritage – the Project will have limited impact on local historic heritage and therefore no economic effects are included in the BCA.	-		
Visual impacts – measures, mainly vegetative screening, will be implemented to minimise visual impacts. The cost of land acquisitions and screening to reduce visual impacts has been included in the Project's capital costs.	-		
Environmental, social and cultural impacts with employment benefits	\$68	-	\$192
Net environmental, social and cultural impacts with employment benefits	-	-	\$123
Net environmental, social and cultural impacts without employment benefits	-	-	-\$68
Net present value (including employment benefits)			\$2,138
Net present value (excluding employment benefits)			\$1,946

Note: When impacts accrue globally, the numbers in brackets relates to the level of impact estimated to accrue to Australia.

The NPV is potentially distributed amongst a range of stakeholders, including:

- CHC and its shareholders in the form of any after tax profits, although these are likely to be minimal given the cost recovery nature of the Project;
- the Commonwealth Government in the form of any Company Tax payable or Minerals Resource Rent Tax from the Project, which is then used to fund the provision of government infrastructure and services across Australia and NSW, including the Central West region. Again, these are likely to be minimal given the cost recovery nature of the Project;
- the NSW Government via royalties, which are then used to fund the provision of government infrastructure and services across NSW, including the local region;
- coal-fired power generators through the provision of lower cost coal and then NSW and Australian electricity consumers through the provision of lower cost electricity; and
- the local community in the form of voluntary contributions to community infrastructure and services, and workforce up-skilling through training programs.

20.3.2 Local and regional economic assessment

The economic assessment examined the Project's impact on the local regional economies (Dubbo, Mid-Western, Warrumbungle and Wellington LGAs). The indicators used to measure local and regional effects were the value of goods and services and the number of new jobs created. The assessment used input-output analysis with the following steps:

- development of an input-output table (regional transaction table) that was used to characterise the economic structure of the region and to determine multipliers for each sector of the economy; and
- identification of the initial impact or stimulus of the Project in a form that is compatible with the input-output equations so the input-output multipliers show flow-on effects to be estimated (West 1993).

The regional input-output table is presented in Table 20.2. The initial regional impact of the Project was estimated from annual revenue, expenditure and employment profiles within the region. Flow-on effects were estimated using the average output, expenditure and employment relationships in the input-output table.

Table 20.2 **Aggregated transactions table: regional economy 2006 (\$'000)**

	Ag, forestry, fishing	Mining	Manufacturing	Utilities	Building	Services	Total intermediate sector	Household expenditure	Other final demands	Exports	Total output
Agriculture, forestry, fishing	34,575	46	79,473	5	215	4,972	119,287	10,963	81,862	245,399	457,510
Mining	17	10,717	6,019	15,049	854	416	33,072	209	-6,175	278,789	305,894
Manufacturing	11,500	5,296	83,591	1,898	39,724	107,825	249,834	115,668	49,454	582,220	997,177
Utilities	3,785	1,867	12,966	117,735	2,367	29,852	168,573	31,452	2,139	82,815	284,979
Building	2,036	1,910	1,504	3,828	85,848	24,365	119,491	0	300,327	43,054	462,872
Services	42,459	15,279	122,375	10,527	43,812	528,518	762,970	814,923	712,527	1,066,502	3,356,922
<i>Total intermediate sector</i>	<i>94,374</i>	<i>35,115</i>	<i>305,928</i>	<i>149,043</i>	<i>172,821</i>	<i>695,946</i>	<i>1,453,227</i>	<i>973,215</i>	<i>1,140,134</i>	<i>2,298,778</i>	<i>5,865,354</i>
Household Income	122,688	44,092	162,500	23,607	120,407	1,291,274	1,764,569	0	0	0	1,764,569
Other value added	110,037	182,990	116,340	60,999	38,827	484,796	993,989	131,368	40,313	4,132	1,169,802
Imports	130,410	43,696	412,409	51,330	130,817	884,906	1,653,569	1,276,306	216,595	162,969	3,309,438
<i>Total output</i>	<i>457,510</i>	<i>305,894</i>	<i>997,177</i>	<i>284,979</i>	<i>462,872</i>	<i>3,356,922</i>	<i>5,865,354</i>	<i>2,380,889</i>	<i>1,397,042</i>	<i>2,465,879</i>	<i>12,109,164</i>
Employment	3,293	635	2,391	353	1,712	21,665	30,050	-	-	-	-

Note: *Totals may have minor discrepancies due to rounding.*

a. Construction

Economic activity associated with the Project's construction will mainly occur within five sectors of the economy:

- the 'other construction sector', which includes businesses involved in the construction of non-residential buildings and sites;
- the 'construction trade services sector', which includes businesses involved in site preparation services, plumbing, electrical, and other trades;
- the 'other property services sector', which includes businesses involved in the leasing of industrial machinery, plant or equipment;
- the 'agriculture, mining and construction machinery, lifting and material handling equipment manufacturing sector'; and
- the 'other machinery and equipment manufacturing sector'.

It is estimated the Project's construction will result in contributions to the local and regional economies of up to:

- \$218 million in annual direct and indirect output;
- \$91 million in annual direct and indirect regional value-added;
- \$68 million in annual direct and indirect household income; and
- 851 direct and indirect jobs.

b. Operations

The majority of regional employment will be generated during operations. In total it estimated the Project will result in the following contribution to the local and regional economies:

- \$714 million in annual direct and indirect regional output or business turnover;
- \$184 million in annual direct and indirect regional value-added;
- \$102 million in annual direct and indirect household income; and
- 1,170 direct and indirect jobs.

The Project will strengthen and diversify the region's overall depth of labour skills through relocating skilled workers and training local recruits. This stronger workforce will provide the region with greater potential to attract further industry and foster economic growth.

20.4 Management and monitoring

The Project will provide substantial economic benefit to the Australian, NSW and regional economies. CHC will procure locally and use the services of local companies wherever cost-effective and will manage its contractors to do likewise. CHC will make major improvements in upgrading local infrastructure and workforce training, and will recruit a high proportion (around 50%) of the operational workforce locally.

CHC is committed to employing local people and supporting them with appropriate training, while protecting the labour pool available to existing local businesses. CHC is already working proactively with service providers in the region to develop training and other education programs for local people, including specific apprentice and Aboriginal employment initiatives.

CHC will monitor its procurement and training activities, and report these publically in the annual environmental management report.

