

LIDSDALE SIDING UPGRADE PROJECT

ECONOMIC IMPACT ASSESSMENT

CENTENNIAL COAL
IVANHOE COAL PTY LTD

June 2012



This document does not purport to be all inclusive or contain all information which its recipients may require. The writer accepts no liability for any direct, incidental, consequential or indirect damages resulting from the use of or reliance on the information contained herein except insofar as any such reliance was made known to the writer on or before the publication of this document. This document also includes certain statements that reflect various assumptions, which may or may not prove correct. Any projections presented in this document are illustrative only and should not be taken as a certain indication of possible future events or returns.

TABLE OF CONTENTS

Table of Contents	3
Abbreviations	4
Executive Summary	5
1. Economic Analysis and Impact Assessment: Purpose and Approach	6
2. Project Background and Justification	6
3. Economic Analysis	
3.1 Focus of analysis	7
3.2 Project-related economic evaluation	8
3.3 Analysis of project alternatives	8
3.4 Sensitivity analysis – alternative project options	9
4. Economic Impact Analysis	
4.1 Approach	11
4.2 Regional Context	11
4.2.1 Lithgow City Council Economic Development Strategy	11
4.2.2 Community consultation	13
4.3 Economic Impact Assessment	13
4.4 Economic benefit to NSW – increased coal royalties	16
4.5 Broader socioeconomic and environmental impacts	16
4.6 Valuation of socioeconomic and environmental impacts	17
4.7 Summary	23
5. Additional Requirements	
5.1 Cumulative impacts	23
5.2. Intra-generational and inter-generational equity	24
6. Summary	25
Reference List	26
List of Tables	
Table 1: Economic evaluation – incremental component of Lidsdale Siding upgrade	8
Table 2: Economic evaluation of alternative project options	9
Table 3: Sensitivity analysis– project options - adjusted discount rates	10
Table 4: Sensitivity analysis -project options- adjusted operating assumptions	10
Table 5: Type 2A Multipliers – mining and services	14
Table 6: Type 2A Multipliers – construction	15
Table 7: Multiplier analysis: Lidsdale Siding Extended Economic Impacts	15
Table 8: Estimate of NSW royalty income – additional production facilitated by upgraded Lidsdale Siding	16
Table 9: Valuation methods – socioeconomic and biophysical impacts	18
Table 10: Economic Impact Assessment – Summary Table	19

ABBREVIATIONS

ABS:	Australian Bureau of Statistics
BAU:	Business as Usual
BCA:	Benefit-Cost Analysis
BCR:	Benefit-Cost Ratio
DPI:	Department of Primary Industries (NSW)
EDS:	Economic Development Strategy
FEL:	Front End Loader
I/O:	Input/Output
LCC:	Lithgow City Council
LGA:	Local Government Area
NPV:	Net Present Value
TPA:	Tonnes per Annum

EXECUTIVE SUMMARY

- This Economic Impact Assessment supports the Environmental Assessment in relation to an application by Ivanhoe Coal Pty Ltd (Centennial Ivanhoe) under Section 3A of the NSW *Environmental Planning and Assessment Act 1979* for improvement works on Lidsdale Siding. Ivanhoe Coal Pty Ltd is a subsidiary of Centennial Coal (Centennial).
- Lidsdale siding is a key component of Centennial's export coal supply chain infrastructure in its Western Coalfield operations. In particular, the upgrade will permit increases in export coal production by Springvale mine.
- Centennial's operations, and the broader mining industry are critical to the economic sustainability of the Lithgow LGA. This role is extensively acknowledged in Lithgow City Council's Economic Development Strategy, and was also apparent in community consultation engagements.
- The proposed Lidsdale Siding Upgrade consists of the automation of the existing train loading system, which presently utilises trucks and front end loaders for loading. The elimination of the use of mobile plant, combined with similar rail loading times, will deliver improvements in biophysical outcomes such as air quality, and noise and vibration.
- The works required to complete the upgrade are largely confined to the existing operational footprint. New works beyond this area will utilise already degraded land. Centennial Ivanhoe has developed operational models, design features and compensatory works that mitigate a number of potential external impacts.
- Capital cost for the project is approximately \$45 million over the period 2012 – 2014. This will have extended benefits through the local and broader economy.
- Operational efficiencies provided by the upgrade are forecast to generate approximately \$543 million (net present value) in incremental income for Centennial over 15 years. This will sustain approximately 8,900 jobs over that time.
- The NPV for the proposed project is favourable compared to the 'business-as-usual' base case, the differential being approximately \$470 million over the 15-year forecast period. The benefit-cost ratios for both options are similar. Under a variety of sensitivity testing scenarios, the economics of the project remain robust.
- The project will also result in increases in royalty revenue for NSW of approximately \$54 million, over the forecast period based on presently held price assumptions.
- There will be ten direct contractor positions made redundant at Lidsdale Siding, however the Siding's improved, continued operations will support 285 positions at Springvale Mine. There is also potential for some redeployment of the contractor on other Centennial operations.
- There are a range of external costs and benefits associated with both the construction and operations phases of the project. The overall impact is likely to be relatively minor in the context of comparisons with current operations at the siding, and the broader industrial character of the region.

1. ECONOMIC ANALYSIS AND IMPACT ASSESSMENT: PURPOSE AND APPROACH

Ivanhoe Coal Pty Ltd (Centennial Ivanhoe) is a wholly-owned subsidiary of Centennial Coal (Centennial). This economic assessment forms part of Centennial Ivanhoe's Environmental Impact Assessment under Section 3A of the NSW *Environmental Planning and Assessment Act 1979* for improvement works on Lidsdale Siding.

The approach to this Assessment is to initially estimate the direct economic costs and benefits of the project. Subsequently, the extended regional economic benefits and costs of the project are estimated. A similar methodology is applied to the alternative project options identified in the Environmental Assessment for the project, to the extent that these options permit analysis.

2. PROJECT BACKGROUND AND JUSTIFICATION

Lidsdale Siding is operated by Centennial Ivanhoe, and forms part of Centennial's supply chain infrastructure in the NSW Western Coalfield. The siding services export coal production from the Springvale Mine (Springvale). In addition to export production, Springvale also supplies coal to the Wallerawang and Mount Piper Power Stations. Springvale mine has current approval to produce 3.4 million tonnes per annum (tpa). At present, export capability is constrained to 2 million tpa, as a result of a combination of contracted volumes for the power stations, and the limitations on export capability resulting from capacity constraints at Lidsdale Siding. There are also some supply chain constraints in relation to Springvale Coal Services (Centennial's coal handling and preparation plant), which Centennial is presently addressing.

In order to achieve optimal production and associated employment at Springvale, Centennial Ivanhoe has determined that improvements to facilities at Lidsdale siding are required to permit efficient handling of additional export coal volumes. The current operational model involves receipt of coal by overland conveyor from Springvale, with train loading and stockpile management conducted using mobile plant (front end loaders [FEL] and trucks). The proposed upgrade will fully automate the coal receipt and dispatch functions at the siding. The efficiency improvements will result in an increase in throughput capacity of the siding from the present 2 million tonnes per annum (tpa) to 6.3 million tpa. The additional capacity delivered by the upgrade will also permit export of coal from other Centennial operations which are serviced by Springvale Coal Services Site.

3. ECONOMIC ANALYSIS

3.1 Focus of analysis

There are two principal aspects of economic impact related to the project. There will be short to mid-term effects resulting from economic activity in the construction phase. Subsequently, there will be ongoing direct economic effects associated with operation of Lidsdale Siding, and possible increases in production at Springvale that the siding supports. The economic stimulus provided by these activities also results in the flow of further activity in the regional, state and national economies.

As would be expected, Centennial Ivanhoe has conducted internal analyses in order to determine the financial and economic feasibility of several project options. The preferred project option clearly represents the best of the options considered from the perspective of economic efficiency.

The economic analysis presented in this assessment provides an overview of these findings. The analysis requires certain assumptions to be made in relation to the expected outcomes of the project. Among these assumptions are estimates of the marginal increases in export production associated with the new infrastructure, as was referred to in previous commentary. Centennial considers this information to be commercially sensitive. Centennial is in a position to provide this information on a confidential basis, as is provided for in the Planning NSW draft guidelines (2002) should this be required. As such however, specific information is not included herein, and the estimates derived are based on conservative aggregate forecasts. Other information, such as capital and certain other costs, future coal price assessments and discount rates, which is of lesser commercial sensitivity, is disclosed where appropriate.

In addition to the improved capability relating to the infrastructure improvements, there are also savings to be achieved in relation to the existing mode of operations. An example of these savings is the reduction in diesel fuel emissions associated with the replacement of mobile

plant, such as front end loaders and trucks, with the conveyor-based automated system. These savings are recognised as benefits in the following analysis.

3.2 Project-related economic evaluation

The benefit – cost analysis (BCA) data presented in the following table are present values, at an assumed discount rate of 7 percent¹. The analysis assumes 15 years asset utilisation commencing at completion of the upgrade project (2014). It is noted that the assumed asset life of the upgraded infrastructure is thirty years, and that over this longer period, it is anticipated that the asset will also be deployed in servicing production from other Centennial mines in the area.

Table 1: Economic evaluation – incremental component of Lidsdale Siding upgrade

Cost Components		Revenue Components	
Description	(\$M)	Description	(\$M)
Capital cost	45	Additional Revenue ¹	781
Operating costs ²	21	-	
Rail and port costs	172	-	
Total incremental costs	238	Total incremental revenue	781
Net Present Value (NPV)	543		
Benefit – Cost Ratio (BCR)	3.28		

¹Assumes incremental throughput volume above current capability (2mtpa), and industry analysis price-per-tonne estimates of \$106 (2014); \$111 (2015) and \$90 (longer term). ²Based on fixed management cost plus incremental cost associated with additional throughput volume enabled by the upgrade works. Rail and port costs are also based on incremental volume.

The analysis above indicates that the economics of the project result in a strongly positive financial outcome. It should be noted that the NPV can be considered a conservative estimate, as the full fixed cost component of operating costs has been attributed to the incremental volume. The positive NPV of the project is adopted for comparison with project alternatives and broader cost-benefit analysis.

3.3 Analysis of project alternatives

Along with the proposed project, the EIA identifies three alternative proposals that have been considered by Centennial Ivanhoe. These are:

- Upgrade Project (Preferred Project);
- Alternative Location (Option 1);
- Alternative Designs and Layouts (incorporating alternative operations) (Option 2);
- Do Nothing/ Business-as usual [BAU] (Option 3).

¹ The economic appraisal principles employed herein are consistent with Planning NSW Draft Economic Assessment EIA Guidelines and NSW Treasury TPP07-6 Economic Appraisal Principles and Procedures Simplified.

A comparison of the economic evaluations of these alternative proposals is included in the following table, to the extent that these alternatives permit detailed consideration. It should be noted that in order to provide valid analysis, the assumptions on incremental activity relating to the upgrade project are added onto the operational assumptions for the BAU case. All values presented in the analysis are present values at a discount rate of 7 percent.

Table 2: Economic evaluation of alternative project options

Evaluation Element	Proposed project (NPV)	Option 1	Option 2	Option 3 (BAU) (NPV)
Capital costs (\$M)	45	Option not further assessed. Relocation impractical due to nature of operations, tenure at site, sunk investment on existing infrastructure etc.	Option not further assessed. Operational outcomes essentially the same as those for Option 3.	0
Operating costs (\$M)	38			62
Rail & port costs (\$M)	524			352
Total costs (\$M)	607			414
Revenues (\$M)	2,233			1,570
NPV	1,626			1,156
BCR	3.68			3.79

In terms of NPV, the upgrade project is clearly superior to the BAU option. The outcome is emphasised by the relativities of the capital costs for these options. The benefit-cost ratios are comparable. In addition, the higher operating costs for the BAU option are also likely to be coupled with significantly higher externality costs. This is as a result of the existing operation being based around the use of mobile plant, with associated increases in emissions, noise and dust impacts. These impacts will be observed in closer detail in the subsequent economic impact assessment.

3.4 Sensitivity analysis – alternative project options

NSW Planning Draft Guidelines (2002) and NSW Treasury Economic Appraisal Principles and Procedures (TPP 07-6, 2007) require sensitivity analyses to be conducted as part of the assessment methodology. The economic assessment above is conducted at a seven percent discount rate. TPP 07-6 stipulates a lower bound of four percent and an upper bound of ten percent for sensitivity analysis. The application of these parameters to the present proposal and the BAU case is displayed in Table 3.

Table 3: Sensitivity analysis– project options - adjusted discount rates

Project option component	Discount Rate 4% \$M	Discount Rate 7% \$M	Discount Rate 10% \$M
Proposed project total cost	743	607	502
Proposed project total revenue	2,746	2,233	1,858
Proposed project NPV	2,003	1,626	1,356
Option 3 (BAU) total cost	518	414	338
Option 3 (BAU) total revenue	1,953	1,570	1,287
Option 3 (BAU) NPV	1,435	1,156	949

As the change in discount rates is proportional for both cases, the NPV of the proposed project remains superior to the BAU case in each instance. There may be any number of possible scenarios that vary from the forecast relativities between revenues and costs. The manipulation of the discount rate provides some indication of the range covered by such possible variances and the associated risk. A further means of testing the strength of the economic case for the proposal is to adjust the economic performance assumptions. Table 4 provides such an analysis, based on a ten percent decrease in income (NPV) and a twenty percent increase in costs (NPV). These were calculated for both the proposed project and the BAU alternative case.

**Table 4: Sensitivity analysis -project options-
adjusted operating assumptions**

Evaluation Element	Proposed project	Option 3 (BAU)
Capital costs (\$M) Δ 20%	54	0
Operating costs (\$M) Δ 20%	46	74
Rail & port costs (\$M) Δ 20%	629	422
Total costs (\$M)	729	496
Revenues (\$M) -10%	2,030	1,427
NPV	1,301	931
BCR	2.78	2.87

Analyses adopting adjustments to discount rates and operating outcomes assumptions indicate that the combination of a robust BCR and superior NPV indicate that the economic outcomes for the project are likely to be positive in most foreseeable eventualities.

4. ECONOMIC IMPACT ANALYSIS

4.1 Approach

This analysis firstly identifies and where appropriate, quantifies the broader impacts of the Lidsdale Siding Upgrade proposal. The effect of the stimulus provided to regional and broader economies by direct construction and operating activity and the additional impacts is then considered. This analysis is then extended to the application of multipliers to quantify the benefit/cost relativities of the proposal. Finally a comparison of specific aspects of the alternative options is conducted in order to establish the overall advantages of the proposal.

4.2 Regional context

Centennial and Centennial Ivanhoe's operations in the Lithgow and adjacent Mid Western Regional Council LGAs are significant contributors to these regional economies. As Lidsdale Siding is situated in the Lithgow LGA, it is appropriate to focus on the recognised contribution of the mining industry to that particular regional economy.

4.2.1 Lithgow City Council Economic Development Strategy

The importance of the coal mining industry to the regional economy is abundantly clear in Lithgow City Council's Economic Development Strategy (EDS) 2010-2014. This is substantiated by the following material included in the EDS;

- *"In 2006, the mining sector employed 10% of the total Lithgow resident workforce second only to the Retail sector at 11.2%" [emphasis added].*
- *"The largest employer in Lithgow Local Government Area is mining".*
- *"only the mining sector had a greater percentage contribution to gross regional product (27%) than its share of employment (12%)²."*

Clearly the sector is of significant importance in the context of such a relatively small regional economy. The comparison of employment to output identified in the second point is indicative of a number of factors. Firstly, mining is relatively capital intensive, so the labour input may comparatively lower. The EDS notes however that as much of the mining in the area is underground mining, this is relatively more labour intensive than open cut mining. Secondly, in

² Note that this figure refers to total employment in the mining sector in Lithgow. The former figure of ten percent relates to the resident workforce of the LGA.

terms of regional output, the sector stands out from the remainder of the local economy on the basis of its productivity.

The EDS also notes that there is scope for expansion in the coal industry, however “there is still pressure for coal industry downsizing from efficiency rationalisation and this may ameliorate [sic] the benefits of increased exports” (p. 87). The current proposal will result in a small number of positions with contractors at Lidsdale Siding becoming redundant. However, the additional capacity provided to service Centennial’s mines will sustain employment for a larger workforce over an extended period when compared with the base case.

The proposal to upgrade Lidsdale Siding is a critical element in maintaining ongoing operation of Springvale and other Centennial mine assets in the area and sustaining employment in those mines. The EDS emphasises the potential for severe impacts on the local economy that are likely to result from any curtailment of mining activity, as is exemplified in the following statements from the EDS:

- *“The major concern here is that many of these mining jobs are concentrated into a handful of businesses hence, as has been experienced in the past, any job losses tend to be on a large scale and hence may have an immediate impact upon the community”*
- *“This may have an impact upon the level of disposable income available to the Lithgow Resident Workforce in the future should the number of people in the mining industry decline further”.*
- *“This industry sector [mining] has also been shown as having a propensity to fluctuate mainly due to its sensitivity to international market forces. A critical impact of this is local business being heavily reliant upon a relatively small proportion of the community which has disposable income but one which can also be severely affected by changes to employment status. These families can also be considered as transient due to the specialised nature of their skills base. In other words a workforce with niche skills such as those in the mining industry are [sic] more likely to move from one region to another for work taking their disposable income with them”.*

The sustainability of the mining sector and its related employment is clearly vital to the broader economic wellbeing of the area. As is established throughout this economic assessment, the proposed project will have a direct and positive impact on economic sustainability.

4.2.2 Community consultation

The Environmental Assessment for the project includes a précis of community consultation findings relating to the proposed Lidsdale Siding Upgrade. Relevant extracts are as follows:

- *“There was a generally acceptance of the rail facility as an historic part of the town and the important role that coal mining plays in the district”;*
- *“The majority of residents attending the sessions understood the link between coal mining and ongoing prosperity but also expressed the desire to maintain environmental values of the region”.*

The consultation process also yielded recognition of a number of the negative externalities associated with mining activity in the area. These may be encapsulated in the following excerpt:

- *“Issues raised by the community in relation to the wider regional developments included general visual impacts, particularly from open cut mining, intensification of mining activities and the recognition of impacts from sources other than Centennial such as other mining operations and the two power stations”.*

It is evident that these issues relate to the broader industrial base of the region. Centennial Ivanhoe’s operations clearly form part of this extant industrial environment. In terms of the Lidsdale Siding Upgrade, the potential for this project to add to the cumulative effects of this broader environment is focal. Subsequent analysis will demonstrate that although some cumulative impacts associated with the project are inevitable, careful consideration in the development of operational models, design features and compensatory works has resulted in the mitigation of any significant cumulative impact.

4.3 Economic Impact Assessment

An estimate of the extended economic impacts associated with the construction works on the Lidsdale Siding Upgrade, and the ongoing operation of the infrastructure can be derived using input-output (I/O) multipliers. The methodology is a broadly accepted approach to providing an approximation of the economic effects of one industry’s activities across the rest of the economy³. There are certain limitations to the application of I/O multipliers. These are also

³ A detailed discussion on interpretation and limitations of multiplier analysis is included in ABS Cat No 5246.0; *Information Paper Australian National Accounts Introduction to Input-Output Multipliers*;

acknowledged by ABS⁴. The practical effect of these limitations is that the output of multiplier analysis can only be considered as *indicative* of outcomes that may result from economic stimuli.

The Environmental Impact Assessment for the project has identified a number of potential sources of externalised costs associated with the proposal. These principally relate to ongoing operations, however clearly there are some short-term effects relating to the construction phase that also require consideration. These issues are also identified in the following analysis and their impacts on the region are assessed.

The NSW Department of Primary Industries⁵ identified output and employment multipliers for mining and related services. While acknowledging the aforementioned limitations on multiplier analysis, the application the relevant NSW Government Department's declared multipliers adds validity to the analysis. Furthermore, a comparison with other publicly available mining industry multipliers indicates that the DPI multipliers may be considered as being conservative. A further advantage of the DPI multipliers is the inclusion of services related to mining in its scope. This is of some relevance, as it provides for a project such as the Lidsdale Siding Upgrade. The improved infrastructure will add value in the export supply chain to support mining and therefore can be considered as such a service. The relevant multipliers are:

Table 5: Type 2A Multipliers – mining and services

Description	Multiplier value
Output Multiplier – mining & services	2.136
Gross Value Added Multiplier – mining & services	4.099
Income Multiplier – mining & services	2.839
Employment Multiplier – mining & services	3.977

In addition to these operations-related multipliers, specific multipliers for construction were also identified on the same bases as those for mining and services⁶. These are relevant for assessment of the impacts of the initial stimulus associated with the upgrade works.

⁴ For example ABS Cat No 1301.0, *Year Book Australia*, 2002

⁵ *The Contribution of Primary Industries to the NSW Economy, Key Data 2012*:
<http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0010/427645/Contribution-of-primary-industries-key-data-2012.pdf>

⁶ The original source of the DPI multipliers is ABS Cat. No. 5246.0 (as above). GVA multiplier derived from ABS Cat No, 5246.0 & Multipliers for Culture-Related Industries, CMC SWG, Canberra.

Table 6: Type 2A Multipliers – construction

Description	Multiplier value
Output Multiplier – construction	2.694
Gross Value Added Multiplier - construction	4.369
Income Multiplier - construction	2.899
Employment Multiplier – construction	2.727

These multipliers were applied to the relevant estimates derived in the economic appraisal in order to assess the multiplied impacts of the project. The multipliers are applied on the basis proposed by ABS (Cat No. 5246.0), being the impact for each \$1 million of additional output.

The analysis was conducted for:

- The effects of development and the incremental operational capacity provided by the project;
- The 'do nothing' base case (representing full operating capacity on the BAU assumption;
- The full operating capacity of the siding assuming post-upgrade capacity, including development effects.

The results of the analysis are displayed in Table 7

Table 7: Multiplier analysis: Lidsdale Siding Extended Economic Impacts

	Preferred project (incremental)	Preferred project (full)	BAU	Differential proposal: BAU
Capital (construction) \$M	121	121	-	121
Revenues/output (Operating) \$M	1,668	4,769	3,354	1,415
GVA (construction) \$M	197	197	-	197
GVA (operating) \$M	3,201	9,153	6,435	2,718
Income (construction) \$M	130	130	-	130
Income (operating) \$M	2,217	6,339	4,457	1,882
Employment (construction) FTE	179	179	-	179
Employment (operating) FTE	3,106	8,881	6,244	2,637

These results indicate the impacts in the regional and state economies over the assumed 15-year project forecast. The analysis indicates that the upgrade project may stimulate an additional \$1.4 billion in economic activity and 2,637 FTE jobs in the regional economy over this period. This is a result of the direct economic stimulus of the development works, coupled

with greater output and more efficient operation of the siding. As the income multiplier provides an estimate of the salaries and wages effect derived from an increase in output, this may provide the most applicable measure with regard to local impacts. In the operating phase, the activity facilitated by the Lidsdale Siding Upgrade may support \$6.3 billion in economic activity in the regional economy over the 15-year period observed.

In addition to these direct economic benefits to the regional and state economy, there are broader benefits to the State in the form of royalty revenues associated with the increase in export production that Lidsdale Siding Upgrade would facilitate.

4.4 Economic benefit to NSW – increased coal royalties

Lidsdale Siding is a key piece of export infrastructure in the supply chain for coal produced at Springvale Mine. As the upgrade of the Siding will result in a significant increase in export capability, this will facilitate increases in royalty revenues for the state of NSW. Taking into account this facilitative aspect of the operation of Lidsdale, the following analysis relates only to the incremental component of production.

Table 8: Estimate of NSW royalty income – additional production facilitated by upgraded Lidsdale Siding⁷.

Forecast estimated incremental revenue (NPV)	Total estimated royalty @ 6.7% (NPV)
\$781 million	\$53.7 million

These revenues are distributed over the forecast 15-year production period. The revenues will contribute to the provision of critical services such as health and education across the state, including the immediate Lithgow region.

4.5 Broader socioeconomic and environmental impacts

The Environmental Assessment identifies the Director General's Requirements with respect to the environmental impacts of the project and subsequent activity. These requirements relate to:

⁷ Deep underground coal (+400m) 6.2 percent; other underground coal 7.2 percent. Production at Springvale Mine varies in this respect. 6.7 percent is the present management estimate. Estimates are based on NPV as per revenue calculations, however royalty is calculated on the proportion of revenues subject of royalties.

- Noise and vibration;
- Soil and water;
- Traffic and transport;
- Air;
- Greenhouse gas;
- Heritage;
- Biodiversity;
- Visual;
- Waste.

Detailed reports on the incidence of each of these matters are included in the body of EIA and the supporting expert reports. The relative positive and negative impacts in relation to each of these factors are compared in the following table. The commentary in the table with respect to benefits and costs are stated *relative to the existing situation* (i.e. these are changes compared to the BAU case).

4.6 Valuation of socioeconomic and environmental impacts

The economic impact assessment undertaken in the preceding sections provides an indication of certain aspects of relative social benefit and cost of the project for the regional community. As is identified in the Environmental Assessment, there are also other environmental and social factors which may impose costs and benefits on the regional community. Bases for evaluating these costs are included in the Table below.

In relation to these valuations, two key points must be observed:

- Where possible, valuation methodologies are derived from studies accessed through relevant government bodies. This may be considered as placing some greater level of reliability on these studies;
- The identified valuation methodologies have been selected to as closely represent similar existing conditions *for this project* as was achievable. However, in some instances the valuation methodologies are either more general, or related to projects of a different nature. In this regard, it is important to emphasise that the present project relates to the development of industrial infrastructure on a site, and in a geographic area that is characterised by existing, similar infrastructure. This fact of itself is a significant mitigating factor in terms of valuing the extent of impacts on social amenity in this area.



Table 9: Valuation methods – socioeconomic and biophysical impacts

Description	Methodology/Source of Valuation mechanism	Valuation measure/unit ⁸	Comment on application
Noise and vibration	Day B, Bateman I & Lake I (2010): "Estimating the Demand for Peace and Quiet Using Property Market Data" - Hedonic pricing (impact on dwelling values) EVRI reference number: 06153-105312	\$75 - \$196/dB per annum	Based on perceived changes in property valuations. Application contingent on number of affected properties
Soil and water	Streever WJ, Callaghan-Perry M, Searles A, Stevens T & Svoboda P (1998): "Public Attitudes and Values for Wetland Conservation in New South Wales, Australia" – simulated market price/WTP EVRI reference number 02309-0732	\$149/household per annum	Estimate relates to remedial works on Cox's River and Pipers Flat Creek. Census 2011 data enumerates the number of households in Lithgow LGA as 7,787.
Traffic and transport	Not separately estimated	Not separately estimated	Impacts are captured in estimates for 'noise and vibration' and 'air'.
Air	DEC NSW (2005): "Health Costs of Air Pollution in the Greater Sydney Metropolitan Region" - cost of injury/replacement; WTP EVRI reference number: 07200-41439	\$236 - \$1,098 per capita per annum	Valuation relates to all air pollution in Sydney GMR. Application herein relates only to improvement relating to proposed project.
Greenhouse gas (GHG)	Not separately estimated	Not separately estimated	Cost assumed as being captured in estimation for 'air' impacts.
Heritage	Allen Consulting Group (2005): "Valuing the Priceless: The Value of Heritage Protection in Australia" – choice modelling/WTP	\$6.80 per capita p.a. for each 1,000 places protected	Assumes Census 2011 population count (Lithgow LGA) of 20,160.
Biodiversity	Land & Water Australia (2005): <i>Making Economic Valuation Work for Diversity Conservation</i> : Australian Government Department of Environment & Heritage: - simulated market price/ WTP	\$145/household per annum (preservation of 700 species –flora & fauna - VIC)	Implied cost of \$0.21 per species. Applied to four (4) identified threatened species on Lidsdale Siding site only, total \$0.84 per household p.a. 7,787 households (as above).
Visual	Not assessed	Not assessed	New infrastructure will be consistent with existing related industrial infrastructure. Unmitigated impact is assessed as neutral.
Waste	Not assessed	Not assessed	No current or future impact on external parties.

⁸ All values adjusted by three percent per annum to allow for inflation.

Table 10: Economic Impact Assessment – Summary Table

Impact	Environmental Assessment Commentary	Benefits	Costs	Mitigation/treatment
Infrastructure construction and commissioning	The project will have an overall positive economic contribution at a regional level and also to the local community	NPV ⁹ : \$543M. Construction phase economic impact: \$121M. Construction phase employment impact: 179 FTE. Operation of Springvale Mine sustained (285 positions). Regional economic impact: \$4,769M. Regional employment impact 8,881 FTE. Incremental impact: \$1,668M. Incremental employment impact: 3,106 FTE.	Outcomes of project and incremental NPV positive, therefore development costs neutralised.	Nil required
Lidsdale Siding operations	The project will have an overall positive economic contribution at a regional level and also to the local community	NPV: \$543M. 10 FTE positions, average salary ≈ \$150K. Operation of Springvale Mine sustained (285 positions). Regional economic impact: \$4,769M. Regional employment impact 8,881 FTE. Incremental impact: \$1,668M. Incremental employment impact: 3,106 FTE. NSW Government royalty revenue \$52M - \$60M	Estimated 10 contractor positions to become redundant at Lidsdale on cessation of current plant-based operations: Net cost not known due to potential for redeployment of labour and plant.	Redeployment of contractor labour and plant to tasks on other Centennial Coal sites to occur on an as-required basis

⁹ These benefits are total over 15 year forecast period.

Impact	Environmental Assessment Commentary	Benefits	Costs	Mitigation/treatment
Noise and vibration	The proposed development will remove most of the current major noise sources from the site. If the type of train proposed for the additional movements are the same as currently used, the maximum sound levels and nature of the train sound will not change. Reductions in total noise emissions are expected	Reduced noise from plant operations. Conveyor operations will produce less noise relative to present operations. Decrease (benefit) estimated at ≈ -2 to -6 dB. Estimate of benefit: $\approx \\$150 - \\$1,176$ per affected property per year.	Construction-related noise: Period of construction $\approx +16$ dB. Assuming construction period of 1 year, total estimate of cost for project: $\approx \\$1,200 - \\$3,136$ per affected property. Possible additional noise for individual train movements ≈ 4 dB to 10 dB.	Operational model sufficient to mitigate impacts; removes use of FELs on train loading. Specific design elements and operations protocols to reduce train noise. Vegetation buffers/screens will further reduce operational noise.
Soil and water	No groundwater dependent ecosystems have been identified in the proposed Project Area/Study Area nor the surrounding area. The surface water assessment confirmed that the existing pollution control systems on site are more than adequate to cater for the proposed upgrade. Removal of willows from natural watercourses (Cox's River; Pipers Flat Creek)	Reductions in onsite storage/use of fuels, oils and lubricants. Stockpile management contained in concrete area surrounding underground loading infrastructure. No groundwater-dependent ecosystems in study area. Regeneration of natural watercourses will improve health of the river system including flood flows. Estimate of benefit $\\$1.16$ M/p.a.	Underground works required in construction stage.	Groundwater and surface water/run-off etc to be managed on site. Management mechanisms included in design of infrastructure. Additional monitoring of water in Cox's River and Pipers Flat Creek Removal of weeds (willows) from river and creek.
Traffic and transport	No net negative impacts anticipated. Significantly lower total vehicle numbers compared with the current operation. Noise from FEL and trucks used to build the stockpile and load the trains would cease to occur with the new arrangement. Community consultation indicates that Wallerawang is still considered a "railway" town and there is a general acceptance of train noise.	All coal received by conveyor. No regular truck movements on road network, (i.e. cessation of current occasional truck movements). Monetised costs are captured in estimates for 'noise and vibration' and 'air'.	Some increase in train movement numbers, however will not disrupt vehicular traffic due to extension of on-site rail spur. Short term increases in traffic during construction phase.	Operational model sufficient to mitigate any impacts. Increased number of train movements will be of similar duration to existing model, but will eliminate impacts of deployment of 3 to 4 FELs for loading.

Impact	Environmental Assessment Commentary	Benefits	Costs	Mitigation/treatment
Air	Measurable improvement in air quality in the local area anticipated.	Significant reduction in emissions from mobile plant. Reductions in dust generation through reduced plant use. Based on 2011 Census Lithgow LGA population of 20,160, implied benefit (health costs) of \$4.8M – \$22.1M	Some residual dust issues associated with train loading and stockpile management (net improvement in air quality).	Operating model mitigates most impacts. Infrastructure upgrade includes improvements in dust management for stockpiles.
GHG production	Principal source of GHG emissions during the operational phase of the Project is the onsite and offsite usage of diesel	Reduction in use of diesel-fuelled plant and more efficient train-loading during operations will reduce emissions. Impacts of train movements neutral (increase in movements, however of shorter duration). Cost not estimated as it is assumed as being captured in the estimate for 'air' impact.	Temporary increase in emissions during construction phase. Increase in aggregate emissions from power grid relating to additional electricity required to power new infrastructure. Total GHG emissions from the operational phase of the Project would represent approximately 0.001% of total NSW 2009 emissions and approximately 0.0004 % of total Australian 2009 emissions.	More fuel efficient FEL to be used for ongoing work such as clean up and stockpile management. Improvement of vehicle usage practices e.g. reductions in idling time for required vehicles
Heritage	Some indigenous artefacts, not in project area. Nil European heritage effects	Indigenous heritage area can be quarantined and preserved. Value to Lithgow population: \$137 per year	Nil. Access to site unchanged.	Initial works to quarantine heritage site.
Biodiversity	Due to the general lack of flora and fauna habitat and the existing footprint of the site, it is considered that the Project would not have a significant impact on threatened ecological communities, threatened species and migratory species.	Little or no impact on species listed under the Threatened Species Conservation Act and present in the region anticipated. Estimate of benefit: of preservation of habitat and EEC ≈ \$6,541 p.a.	Rail siding and shunt line construction - some tree trimming or minor tree removal may be necessary during construction to allow safe clearance from the rail line.	The project area is largely contained within the existing operational footprint. In particular areas such as that containing the Endangered Ecological Community lie outside the project area. Large areas of unaffected equivalent habitat in broader area.
Visual	Expected visual impacts of the project will be moderate	Additional screening will reduce aesthetic impact of current/future infrastructure/operations	Some short term impacts in construction stage (cranes etc). New infrastructure similar to existing on site and in broader area.	Vegetation buffers/screens

Impact	Environmental Assessment Commentary	Benefits	Costs	Mitigation/treatment
Waste	Lidsdale Siding operates in accordance with a Waste Management Plan which provides for the correct handling, disposal and minimising of waste generation	Waste managed in a manner that minimises impact on site users or local communities. Reduction in certain wastes relating to lower use of mobile plant on site (e.g. waste oil)	Temporary increase in wastes during construction period	Specific plan developed for waste management during construction period.

4.7 Summary

There are several sources of benefit associated with this proposal. From Centennial Ivanhoe's perspective, there are benefits in terms of operational scale and efficiency. Centennial Ivanhoe has assessed a number of alternatives to the preferred project in arriving at this conclusion. This assessment of itself has positive implications for the broader regional economy, as it is focused on providing infrastructure to support continuation of operations.

There are also broader benefits associated with the proposed operational model and the infrastructure required to support that model. Principally, the proposed works will significantly reduce a number of external impacts on the community, and in some instances, such as the remediation of waterways, will improve community outcomes. Simultaneously, the approach taken to design of the new infrastructure will preserve certain biophysical features, thus retaining the 'non-use' or 'existence' value of these features.

The proposed infrastructure is consistent with existing industrial infrastructure in the immediate surrounds. Furthermore, it does not significantly expand the 'footprint' or represent any significant encroachment on residents' or community property or amenity.

There are a lesser number of costs or negative impacts associated with the proposal. However, when placed in the context of the existing use of Lidsdale Siding and surrounding industrial infrastructure, and the very significant contribution of mining to the regional economy, these costs are outweighed by the benefits the project will generate.

5. ADDITIONAL REQUIREMENTS

5.1 Cumulative impacts

As part of the assessment of such a project, it is necessary to have regard to the impacts of the existing situation, and in particular any other concurrent expansion or application that may cumulatively increase impacts in the area. As has been observed previously, the proposed works are consistent with the industrial character of the surrounding area.

The Environmental Assessment identifies a number of recent, current and imminent proposals, the majority of which relate to the mining and energy industries already established in the

geographic area. In relative terms, the effects of the Lidsdale Siding Upgrade are expected to be marginal in the context of the scale and number of other proposals. A significant factor in this conclusion is that the infrastructure and operations largely represent a substitution for existing infrastructure and equipment, and for a less efficient mode of operation.

With respect to biophysical impacts the containment of the majority of the expansion works within the existing operational footprint reduces the contribution of the Upgrade to cumulative effects. Furthermore, the location of new infrastructure beyond that footprint, such as the increase in rail length, is contained on already degraded areas. As is established in the Environmental Assessment, this approach will reduce impacts on more sensitive areas. The economic analysis of environmental risks and effects reported in Table 10 demonstrates that the project will have the effect of *reducing* certain impacts, and to some extent may therefore mitigate the cumulative impacts of other industrial projects and activities.

5.2 Intra-generational and inter-generational equity

The economic impact of mining and related services to the regional community is substantiated in the assessment of economic impacts undertaken in this document, and in the conclusions contained in the LCC Economic Development Strategy. The evidence suggests that the positive effects of these contributions on the regional economy are significant and apparent. The EDS in particular emphasises the economic risk that possible reductions in mining activity pose for the region. The mining sector is the major regional economic factor in the sustainability of commercial, retail and service industries in the area. The proposed project serves to promote intra-generational equity, as it will facilitate the continuation of mining at a level that supports present mining production and employment and thus continues to sustain the local economy to the benefit of the broader community.

From the perspective of intergenerational equity, the continued operation of Centennial's mining activity which is supported by the project will also sustain longer-run employment in the mining industry and in the other sectors that benefit from the flow of mining-related expenditure and incomes through the regional economy. A withdrawal or reduction in these economic stimuli would have longer run impacts, negatively affecting the sustainability of businesses in the Lithgow region and placing the availability of more diverse local employment opportunities at risk.

In addition to consumption effects, such direct and extended impacts would also be likely to entail household wealth effects in the region. A decline in overall business activity that would flow from any curtailment in mining may result in negative impacts on property values and other forms of savings that have some influence on longer-run household finances. In order to address associated changes in lifetime consumption preferences, households may reduce immediate consumption, further inhibiting regional economic stability. It is clear that the LCC EDS anticipates such a threat in relation to possible contraction of the regional mining industry. In its key role in Centennial's export capability, the Lidsdale Siding Upgrade will provide greater certainty for the regional economy. From a public administration perspective, the project will forestall reductions in mining activity, which in turn will contain increases in transfers and other reactive solutions that create demands on public finances and other resources.

6. SUMMARY

As the Lidsdale Siding is an integral part of the export supply chain infrastructure, economic analysis establishes that the project will have a positive economic impact on operating outcomes for Centennial Ivanhoe and Centennial Coal more generally. This is principally a result of the role of the Lidsdale Siding Upgrade in supporting continued operations and associated employment at Springvale Mine and other Centennial mines in the area.

The assessment of the importance of mining in the regional economy is emphasised in the Lithgow City Council EDS. The Environmental Assessment also provides evidence of recognition of the crucial contribution of mining to the region identified during the community consultation process relating to this proposal. In addition to these regional benefits, benefits to NSW in terms of royalty income, and Australia with respect to the potential for increased export revenues are also anticipated.

Along with these significant economic benefits, there are number of broader socioeconomic and environmental impacts that are assessed in this analysis. In considering these matters, it is important to acknowledge that in each instance Centennial Ivanhoe has developed mitigatory and/or compensatory strategies to either ameliorate, or in some instances, reduce impacts when compared with the BAU option.

REFERENCE LIST

Allen Consulting Group (2005): *Valuing the Priceless: The Value of Heritage Protection in Australia*, Research Report 2, Heritage Chairs and Officials of Australia and New Zealand, Sydney.

<http://www.heritage.nsw.gov.au/docs/Research_ValuingthePriceless_2005.pdf >

Cultural Ministers Council (2001): *Multipliers for Culture and Related Industries*, National Centre for Culture and Recreation Statistics, Australian Bureau of Statistics, November 2011.

http://www.archive.dcita.gov.au/2007/12/cultural_ministers_council/media_releases/multipliers_for_culture_related_industries_2001#Output,20added20employment%20multipliers

Day B, Bateman I & Lake I (2010): "Estimating the Demand for Peace and Quiet Using Property Market Data" EVRI reference number: 06153-105312

<<https://www.evri.ca/Global/Splash.aspx> >

DEC NSW (2005): "Health Costs of Air Pollution in the Greater Sydney Metropolitan Region" EVRI reference number: 07200-41439 <<https://www.evri.ca/Global/Splash.aspx> >

Environmental Valuation Reference Inventory.

<<https://www.evri.ca/Global/Splash.aspx> >

Land & Water Australia (2005): *Making Economic Valuation Work for Diversity Conservation*: Australian Government Department of Environment & Heritage

<<http://www.environment.gov.au/biodiversity/publications/economic-valuation/pubs/economic-valuation.pdf>>

Lithgow City Council (2010): Economic Development Strategy 2010-2014.

<<http://archive.lithgow.nsw.gov.au/documents/Final%20EDS%20Strategy%20Adopted%202106.pdf> >

New South Wales Department of Primary Industries (2012): *The Contribution of Primary Industries to the NSW Economy, Key Data 2012*. Trade & Investment, NSW Government 2012.

New South Wales Treasury (2007): *Economic Appraisal Principles and Procedures Simplified*, Policy and Guidelines Paper TPP 07-6, Office of Financial Management, NSW Treasury, Sydney.

Planning NSW (2002): *Guideline for economic effects and evaluation in EIA*. Planning NSW , 2002.

RPS (2012): *Lidsdale Siding Upgrade Project, Environmental Assessment*. RPS Australia East Pty Ltd, Broadmeadow NSW.

Streever WJ, Callaghan-Perry M, Searles A, Stevens T & Svoboda P (1998): "Public Attitudes and Values for Wetland Conservation in New South Wales, Australia" EVRI reference number 02309-0732 <<https://www.evri.ca/Global/Splash.aspx> >