Review of Watermark Coal Project Environmental Impact Statement

Economic Impact Assessment

Prepared by

Economists at Large Pty Ltd

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Report prepared by:

Economists at Large Pty Ltd
Melbourne, Australia
www.ecolarge.com
info@ecolarge.com

Phone: +61 3 9005 0154 | Fax: +61 3 8080 1604
65 Bevan St, Albert Park VIC 3206, Melbourne, Australia

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Authors:

Rod Campbell
Mike Paas

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Summary

The socio-economic assessment of the Watermark Coal Project is not suitable for decision making in its current form. It fails to clearly demonstrate the economic benefits of the project to NSW and Australia, overstating the financial case for the project, while understating impacts on agriculture, environmental and health. It is not clear that the project represents a net present benefit to the community.

Key issues that need to be considered include:

- The assessment relies on the proponent's unsourced forecast of semisoft coking/PCI coal prices of AUD$142. This is substantially above other analysts' estimates.
- The assessment assumes the project will be able to sell 86% of its production into metallurgical coal markets. Historically, much PCI coal is not able to be sold into metallurgical coal markets and is instead sold more cheaply as thermal coal.
- Royalty revenue is the most important benefit from the project for decision makers to consider. The assessment seems to overstate royalty revenue in present terms by $82m. The assessment's royalty calculations are not transparent or adequately explained.
- Estimates of tax revenue in the assessment rely on high prices and theoretical company tax rates rather than the effective tax rates that mining companies in Australia face. This serves to overstate the likely tax revenue by around $700m.

We estimate the financial benefits to Australia of the project are around $541m. The economic impact assessment and cost benefit analysis do not present an accurate picture of the negative impacts of the project that need to be considered and could well outweigh this financial benefit. Negative impacts include:

- Impacts on agriculture due to increased cost and reduced availability of:
    - Labour
    - Water
    - Freight
    - Impact of air quality and coal dust
- Impacts on external costs such as:
    - Ecology, including threatened species and ecosystems
    - Aboriginal heritage
    - Human health
    - Greenhouse gas emissions – particularly if production is eventually sold into thermal coal markets
    - The assessment includes a misleading value on the social benefit of employment which has been widely criticised and is not included in standard cost benefit analysis.

In conclusion, the Watermark project is not accurately presented in the economic assessment. The economic case for the project has been overstated, while its social and environmental costs have been understated. Without considerable revision it is not clear that the project represents a benefit to the NSW or Australian community and should therefore be rejected.

Introduction

The proposed Watermark Coal Project is for the construction of an open-cut mine into agricultural land and native forest, in the Liverpool Plains region, 25km south south-east of the township of Gunnedah and to the immediate west of the village of Breeza, within the Gunnedah Local Government Area. The project is approximately 282 kilometres by rail from the port of Newcastle, NSW. The proposal is for a 30-year open cut mine which will extract up to 10 million tonnes per annum of Run of Mine (ROM) coal. The proponent is currently seeking planning approval and has prepared an Environmental Impact Statement.

The Watermark Coal Project is one of several mining proposals or mine extension projects in this traditionally rural area. Local community group, the Caroona Coal Action Group (CCAG), is concerned that the proposed projects will affect agriculture; water resources; the community; native grassland and forest; and threatened species of flora and fauna, including the koala.

This submission

The CCAG is making a submission on the Watermark Coal Project Environmental Impact Statement (EIS). As part of their submission they have asked Economists at Large to review *Appendix AF - Economic Impact Assessment* (EIA). We consider there to be a number of significant flaws in the EIA, which, without being addressed, would render the assessment unsuitable to contribute to decision-making. These issues are:

- **Overstatement of sale value of coal**
- **Overstatement of royalty value**
- **Overstatement of tax revenue**
- **Understated impacts on agriculture**
- **Inadequate consideration of other external costs such as**
    - **Ecological impacts**
    - **Health impacts**
    - **Aboriginal heritage**
    - **Greenhouse gas emissions**
    - **Social value of employment**

We believe that all these issues need to be clarified and adjustments made to the economic assessment of the project to ensure a decision is made in line with the NSW public interest. Doing so would not only allow for the best outcome in relation to this project, but could serve as a guide for other projects in the area and nationally.

This is occurring at a time when the mining industry is perceived as lacking a "social licence to operate" in farming areas. Conflicts between farming communities and coal and coal seam gas developments are making headlines regularly, with farmers and the broader community losing confidence that such developments are in the community's best interests. Robust and transparent assessment of this project will help to address this issue by improving mutual understanding and ensuring decisions are made in line with the public interest.

Sale value of coal

Arguably the most important item in the economic assessment is the sale value of the coal. Gillespie Economics estimate this at a present value of $8,147m based on the proponent's estimates of production of semi soft coking/PCI and thermal coal and prices of AUD$142/t for metallurgical coal and $99/t for thermal coal. These price estimates were "provided by Shenhua Watermark" to Gillespie Economics.

Current prices are well below these levels and independent analysts are forecasting much lower prices, particularly for semi soft coking coal. In March actual prices were around USD$110/t for this coal and while there are forecasts of an increase to USD$115 over the next few years, other analysts have their long term real forecast as USD$100. Forecasts for long term thermal prices are closer to those provided by Shenhua to Gillespie Economics of around USD$95/t (see NAB 2013; CBA 2012a; CBA 2012b).

These different forecasts of the semi soft coking coal price are of great importance for the evaluation of the project, as the proponent's models assume they will sell 86% of their product coal into this market (Hansen Bailey 2012) (EIS main volume p301). Without these higher prices some $2.3b is wiped off the value of the project:

	Shenhua/Gillespie Economics ($AUDm)	Independent analysts ($AUDm)
Semi soft/PCI price	$142	$100
Thermal price	$99	$95
Sale value of production (PV@7%)	$8,147	$5,888
Present value of costs	$5,100	$5,100
Net present value of production costs and benefits	**$3,047**	**$788**

Some notes on these calculations:

- Shenhua's price is in AUD, while most analysts quote coal prices in USD. For simplicity we have assumed an exchange rate of 1.00, below current rates, but above the long term average.
- Both coal prices and the exchange rate are subject to fluctuation and Gillespie Economics do provide very basic sensitivity analysis on p49 of the economic appendix. The sensitivity analysis assesses changes of only 20% of variables, which is inadequate given the volatility of coal prices and exchange rates. Furthermore, sensitivity testing assesses only changes to one variable at a time – the possibility of a 20% decline in coal price combined with an

adverse change in costs or exchange rate is not considered. By not considering such scenarios, the strength of this analysis is weakened.

- In the sensitivity analysis, the estimate of the project's value to Australia at 20% lower AUD coal prices is $1,071m. Given the current market conditions and independent analysts' outlook, this estimate provides a better guide to the proponent's views on the central value of the project, although we believe it still overstates the value to Australia and NSW, discussed below.
- Independent production values are based on the production schedule on p36 (Hansen Bailey 2012) (EIS main volume), while the Shenhua/Gillespie estimate is from table 2.2 of the cost benefit analysis. As the full production schedule is not provided we used linear estimates between the provided years. This causes a minor reduction in estimated total production compared to EIS estimates. We suspect this discrepancy would be mainly in the final years of the project where production reduces from 5.6mtpa to 1.1mtpa over 5 years. Our linear estimate would probably understate production in years 26-29. Being so late in the project the present value of this discrepancy would be minor.
- Present value of production costs in both cases is taken from table 2.2 of the cost benefit analysis.

It is worth noting that due to declining semi soft/PCI prices, many producers have been selling this coal into the cheaper thermal coal market. This has been common practice over the longer term –in only 2004 the difference between thermal and coking coal markets widened and the demand for PCI coals significantly expanded. Since then this difference has declined and the future of these markets is uncertain (Lucarelli 2011). Even though the project's economic modelling relies on selling 86% of production into metallurgical coal markets, the project justification in the EIS main volume seems to emphasise thermal coal production, acknowledging this history:

> ***9.3.4 Economic Benefits of the Project***
>
> *The project will facilitate the recovery of a valuable, export quality thermal coal. Thermal coal remains a highly sought after energy source in Asian countries, including Japan, China and India. These countries continue to be the world's largest coal importers and will largely account for an approximately 70% growth in total coal imports from 2009 to 2035.*

In this section the thermal coal of the project is emphasised over its metallurgical coal.

Royalty revenue to NSW

Gillespie Economics estimate that royalties accruing to the NSW state government from the project will amount to a present value of $565m. This figure is closely tied to the above discussion of coal values, as NSW calculates royalty revenue from open cut coal based on the sale value. If the sale value of the coal has been overstated, then the value of the royalties has also been overestimated.

It is not immediately clear how Gillespie Economics have calculated their estimate of $565m. This represents only 7% of their estimated value of production, while (NSW DII 2008) stipulates the rate

as 8.2%. 8.2% of this value would be $668m. We urge clarification of this issue as royalties are the main benefit of the project to the state of NSW. Without transparent calculations on this point, NSW decision makers cannot make informed decisions about this project.

It is possible that Gillespie Economics adopt a pessimistic approach to royalty calculations to allow for deductions and the difficulties the NSW public service has in collecting coal royalties. According to the NSW Auditor General:

> [The Department of Industry and Investment] *cannot assure the people of NSW that all royalties owed are being paid in full. This is because it does not have sufficiently robust systems and processes to identify what is owed and to make sure it is paid.*
>
> *What needs to be paid is complex to calculate and guidance on this is inadequate. Auditing and monitoring processes for royalties are not strong enough. Penalties do not apply to underpayments, even if persistent, as long as some payment is made on time.*(NSW Auditor General 2010) *p2.*

It seems unlikely, however, that allowance for these issues is the cause of such a large discrepancy as the Auditor General discusses differences of merely millions rather than tens of millions of dollars in royalty revenue.

Regardless of the rate applied by Gillespie Economics, the main point remains that if the sale value of coal has been overstated, then the value of royalties will also be overstated. Applying a royalty rate of 8.2% to the sale value of coal based on independent price forecasts results in a much lower present value of royalties, of $483m:

	Shenhua/Gillespie Economics	**Independent analysts**
	($AUDm)	**($AUDm)**
Semi soft/PCI price	$142	$100
Thermal price	$99	$95
Sale value of production (PV@7%, 30 years)	$8,147	$5,888
Applied royalty rate	7%	8.2%
Net present value of production costs and benefits	**$565**	**$483**

If Gillespie Economics applied royalty rate of 7% is more reflective of the effective royalty rate faced by Shenhua – possibly due to deductions or State government rebates of some kind – then the present value of royalties at independent analysts' price forecasts is only $412m.

Taxes accruing to Australia

As the project is wholly owned by overseas interests, Gillespie Economics correctly identify that most of the economic benefits of the project will accrue outside of Australia and should not be considered relevant from an Australian perspective. This important point was not considered in some of their earlier assessments, where offshore profits were considered part of "NSW community benefits". See for example (Gillespie Economics 2011; Gillespie Economics 2010; Gillespie Economics 2009).

In their assessment of the Shenhua Watermark project, Gillespie Economics estimate the tax revenue accruing to the Federal Government as the main economic benefit of the project to Australia. Their estimate of $745m (present value) is derived by applying a company tax rate of 30% to "net production benefits" after deduction of royalties.

We suggest that this approach overstates the value of tax revenues for two reasons:

- As "net production benefits" is derived from the sale value of coal based on Shenhua's optimistic forecast of semi soft coking coal prices, applying a taxation rate to this estimate will also overstate the value of tax collected, in the same way as discussed in relation to royalties.
- While a corporate tax rate of 30% is theoretically faced by companies, mining companies receive a wide range of rebates, tax exemptions and depreciation allowances, see (Grudnoff 2012). The effective tax rate they face is, therefore, much lower. (Richardson & Denniss 2011) estimate the effective corporate tax rate faced by mining companies in Australia at 13.9%, while (Markle & Shackelford 2009) estimated this rate at 17%

Comparing the calculations from Gillespie Economics and Shenhua's estimates of prices, royalty and tax rates with those of independent researchers, we see that the tax revenue is likely to be overstated by almost $700m:

	Shenhua/Gillespie Economics	Independent analysts
	($AUDm)	($AUDm)
Semi soft/PCI price	$142	$100
Thermal price	$99	$95
Sale value of coal	$8,147	$5,888
Costs	$5,100	$5,100
Net production benefits	$3,047	$788
Royalties	$565	$483
profit less royalties	$2,482	$305
Tax rate	30%	15.50%
Tax paid	**$744.60**	**$47.32**

Some notes on this table:

- Again for simplicity we are assuming an exchange rate of 1, below current rates, but above many long term forecasts.
- Royalty rates are as above – 7% for Shenhua/Gillespie and 8.2% for independent analysis.
- We have used an effective tax rate of 15.5% as a midpoint between the findings of (Richardson & Denniss 2011) and (Markle & Shackelford 2009)

Summary of financial benefits

	Shenhua/Gillespie Economics	Independent analysts
	($AUDm)	($AUDm)
Federal taxes	$745	$47
State royalties	$565	$483
Community fund	$11	$11
Total	**$1,321**	**$541**

We urge decision makers to consider the implications of this comparison. The value of the project as estimated by Gillespie Economics seems unrealistic unless there is:

- a major resurgence in the strength of semi soft coking coal/PCI prices; combined with
- a sustained decline in exchange rates, to levels well below 1.00; and
- major changes to the taxation arrangements for mining.

We suggest that a mid estimate for the value of the project is $541m, consisting largely of royalties. Against this financial benefit, decision makers need to consider environmental and social externalities and the adverse impact this project would have on other industries, particularly agriculture.

We also urge decision makers to note the difficulty involved in verifying the estimates and calculations used in the economic assessment. The assessment does not include crucial data for review of this work and lacks clear justification for many of its assumptions:

- While ROM coal estimates are provided, no estimate is given for product coal, either metallurgical or thermal. No reference is provided, even though this is a critical element to many calculations in the cost benefit analysis. To find this information the public needs to find a single reference on page 301 of the main volume of the EIS.
- No production schedule is provided in the economic assessment, even though this is also crucial in verifying estimates of present values. Again the main volume provides a rough production schedule which is used in the above analysis, although no reference to this is provided in the economic assessment.
- Sensitivity analysis is cursory, with no discussion of the range selected or of the potential for cumulative impacts. This is clearly against the NSW Treasury guidelines for economic appraisal (NSW Treasury 2007), which state:

> *Sensitivity tests on the expected cost and benefit aspects (such as benefits derived from expected patronage) for the preferred option should not just be the standard "+ or – 10 or 20%" analysis often applied to those individual components, but should*

draw on empirical data and factual experience from recently commissioned "like" projects – ie what was the expected outcome, and what was the actual outcome. (p23)

Sensitivity testing of results should include "worst case" outcomes such as combining variables - increasing costs and decreasing benefits. (p64)

This lack of critical information for review and selective adherence to guidelines is sadly typical of economic assessments in current major project assessments. We urge decision makers and planning departments to require project proponents and consultants to provide this information to facilitate independent review. Doing so would greatly increase public confidence in the assessment process.

Impacts on Agriculture

The Economic Impact Assessment suggests the project will have a mildly positive influence on agricultural industries. In Table 3.8 (p38) the modelled impacts on the local and regional economy are broken down by sector employment, including primary industries, the results are summarised below:

Industry	Impact on number of local jobs	Impact on number of regional jobs
Primary	+4	+7

Notes on this table:

- Only impact on employment is provided in the economic assessment, with no estimates of change in output or value added. We assume that a similarly mild positive impact would be shown in these measures if they were to be provided.
- The local area is defined as Gunnedah, Tamworth and Liverpool Plains Local Government Areas.
- The regional area is defined as Gunnedah, Tamworth, Liverpool Plains, Narrabri and Upper Hunter Local Government Areas.

This finding is contradicted by the experience of local farmers as other coal developments have moved into the region. Rather than increases in the number of people they are employing, members of the Caroona Coal Action Group have been reducing employees.

As the Shenhua Watermark project would be larger than other projects in the area and closer to the more agriculturally intensive Liverpool Plains, this project's impacts on agricultural employment will be still more acute.

The reason for the difference between the results modelled in the economic impact assessment and the reality experienced by local people is the assumptions of the model used. The key assumption in the input-output model used here is explained in an appendix by Gillespie Economics on p51:

> *Unlimited labour and capital are available at fixed prices; that is, any change in the demand for productive factors will not induce any change in their cost.*

In other words, the model assumes there to be an unlimited number of engineers, labourers, transport workers, water, arable land, machines, trucks and trains in the region. It also assumes that the project moving into the area will have no influence on the prices paid for skilled labour, machinery and services. In reality mining projects have already caused dramatic reductions in the amount of labour, capital and other inputs available to agricultural industries and the Shenhua project would exacerbate this impact due to its size and proximity to the more agriculturally intensive areas of the Liverpool Plains.

Due to the unrealistic assumptions behind input-output models such as this, many economists are wary about using their results for project assessment. In fact, the ABS has stopped publishing data for parts of these models due to:

> *considerable debate in the user community as to their suitability for the purposes to which they were most commonly applied, that is, to produce measures of the size and impact of a particular project to support bids for industry assistance of various forms.* (ABS 2011)

Where other projects have taken a modelling approach without the assumption of unlimited resources, it is shown that major mining projects take a heavy toll on industries that compete for similar resources and are exposed to trade, particularly agriculture and manufacturing. For example, the economic analysis of the China First Coal Project in Queensland, carried out for the proponents of that mine used a model which included resource constraints (AEC group 2010). This analysis found that proceeding with that project was likely to result in the loss of significant numbers of jobs in the agriculture and manufacturing industries. Compare these results to those obtained through input-output modelling:

Mine Project	Annual mine output Mtpa (Run of Mine)	Forecast impact on agricultural employment	Forecast impact on manufacturing employment
Shenhua Watermark	**10**	**+7**	**+65**
China First	**56**	**-192**	**-2215**

Sources: (Gillespie Economics 2013)(AEC group 2010)

While the China First Project is larger than the Shenhua project, this comparison shows the differences between modelling methods. While general equilibrium modelling, with its more realistic assumptions shows that the China First Project will destroy thousands of jobs in manufacturing and agriculture, the input-output modelling of the Watermark project, with its lack of resource constraints and price changes, suggests an increase in employment.

Below we detail some of the impacts on agriculture which are not captured by the economic impact assessment. In all cases this serves to understate the impact on agriculture the project would have.

Labour

As mentioned above, many agricultural businesses have already reduced their demand for labour due to increased price and reduced supply. Stories abound of the difficulty of getting access to labour both skilled and unskilled:

- Costs for farm labour have risen dramatically, from $18 to $27 per hour, based on landholder reports. In addition to this, many labourers need to be housed on-farm as they are no longer able or willing to afford rental in nearby towns. This imposes significant new costs on agricultural businesses, which is not captured in the economic impact assessment.
- Less skilled labour is available. For example, hydraulic engineers are important to intensive irrigation operations like those in the area. During operations a fault in a pump can cause serious damage to crops and financial losses. Callout times for hydraulic engineers has been 1 to 1.5 hours, but has now gone out to over 24 hours as the few engineers in the area are also in demand from mines.

Water

The input-output analysis assumes there is an unlimited amount of water available to all industries in the model. This is clearly not the case and will understate the project's influence on agricultural industries:

- The region's water users have reduced water usage significantly since the water sharing plan process began in 2006. Depending on the groundwater zone, water usage reduces by between 40% and 70% under the plans, which aimed to ensure the long-term sustainability of irrigation in the region. Prior to these reductions most properties were fully developed for their groundwater allocations, creating serious pressures for landholders during this adjustment.

- According to the economic assessment the project will remove a further 1420ML from agricultural uses. This cannot be achieved without a significant impact on agricultural industries, which is not captured in the economic impact assessment's modelling.

- The economic impact assessment also does not capture the increase in groundwater prices that have been occurring and that will be exacerbated by the Watermark project. Both the impact assessment and the cost benefit analysis assume that water markets operate perfectly, but in reality there is very little groundwater available for sale.

- Both the economic impact assessment and the cost benefit analysis fail to make any attempt to quantify the risks of contamination of both the Mooki River and groundwater resources. During wet seasons, the CCAG argue that the designed water storage of 2,000ML will be insufficient to hold contaminated runoff from the overburden, active mine pit and rehabilitated areas. This could result in contaminated water being pumped in to the Mooki River. The runoff will be highly saline and not useable in an agriculture system.
- Shenhua state "Based on the configuration and capacity of the proposed water management system, there will be no uncontrolled offsite spills from mine water storages or controlled discharges during non-extreme events". However, it is clear that during times of high flow, the mine will discharge into the river. It is at these times that irrigators with Mooki River

water licences are allowed to pump into their water storages. This surface water is extremely important as irrigators transition to the practices necessary to implement the water sharing plans.

- The effect will be that either irrigators will not be allowed to pump water during this period of mine water expulsion, thereby causing irrigators to miss an opportunity to pump water into their storages or irrigators will be allowed to pump during the "High Flow" and minewater expulsion thereby having irrigators pump contaminated water onto their property. Both of these impacts would have a major impact on irrigators which is not captured in the economic impact assessment.

- The capital cost of developing unregulated river water is high due to the infrastructure required – river pumps, lift pumps & storages etc. If the Watermark project also impacts on the availability of this water via reduced surface water flows which their model indicates will be at least 25% in the Mooki sub catchment and the possibility of contamination, this also shifts the economics of using unregulated water and its value. This is not considered in the economic impact assessment or the cost benefit analysis.

- It is important to remember that the Mooki River is unregulated. If the mine needed to discharge water into the river, there is no capacity to flush the system out with release from an upstream dam, resulting in a prolonged period of contamination. This risk is not included in the economic assessment.

- The project will result in the drawdown of groundwater sources and reduced recharge to aquifers. This will increase pumping costs (diesel & electricity) to irrigators. These costs are significant. It is not unusual for landholders to spend $38,000 per month on electricity for pumping. No increase in these costs is considered in the economic impact assessment.

More details on the impacts of water on agriculture are provided in other parts of CCAG's submission. This discussion highlights how impacts on water resources have not been adequately considered in the economic impact assessment. Given the value of water resources to the farming systems in the area, if water availability is reduced as a result of the project then a sustainable resource and industry is put at risk.

Air quality

*Agricultural Impact Statemen*t *(*Appendix Z) inadequately addresses the risks to a number of large cotton farms which are located downwind and in close proximity to the proposed mine. Representatives of Namoi Cotton say the current discount attributable to colour downgrades to cotton is $50 - $65/bale, around 17% of its value. If there is any 'greyness' to the cotton it will be downgraded.

Cotton bolls open at the end of February and are harvested by the end of May, giving a window of three months when cotton is susceptible to coal dust. If any mine blasts occur in this period and the winds flow from the south east or east this risk increases. In addition the Autumn months are highly at risk of temperature inversions which will mean any coal dust will 'hang' in the valley and be

suspended in the air until the warm & cool temperatures mix. Temperature inversions always happen close to the ground ie crop level.

Neither the economic impact assessment or cost benefit analysis incorporate this risk.

Freight

Freight costs for agricultural producers have increased by approximately 50% in recent years due to the expansion of mining in the region and insufficient investment in new transport infrastructure. Where in the past the rail network transported agricultural produce and commodities to port, agricultural producers are increasingly relying on road transportation.

Agricultural operations are often highly time-sensitive. During harvesting, secure access to transport is critical to ensure crops are safely conveyed to storage and to avoid weather damage. Often farmers are in a race against the weather, as rain on a mature crop can result in a significant downgrade of quality and of price.

The economic impact assessment assumes no limits on freight services, which serves to understate the impact of the project on agriculture.

Land Values

The cost benefit analysis understates the impact of the project on agriculture and surrounding landholders by assuming that "The market value of land reflects among other things, the present value of the expected stream of profits from the next best alternative land use (agriculture). This assumption of a perfectly functioning property market is misguided. Recently landholders near Breeza had the banks refuse to commit to a valuation of properties for lending purposes due to the proximity of the land to the project. The land devaluation of nearby properties should be incorporated in the economic assessment. Clearly such a large, disruptive project adjacent to properties will impact on the productivity and operating costs of them and on the number of willing buyers.

Agricultural development

Another factor to consider in assessing impacts on agriculture is the changing nature of production in the area. As development pressures have forced agricultural land out of production closer to Sydney, urban centres and the Hunter Valley, higher value production has begun to move into the Liverpool Plains region. Higher value certified organic crops have recently been planted in the region and some landholders have been considering horticulture crops. Both the economic assessment and the *Agricultural Impact Assessment* (Appendix Z) ignore this change to higher value development.

It is beyond the scope of this submission to appropriately model and quantify the impacts on agriculture and other industries that would be brought about by the Shenhua project. It is clear, however, that the conclusions of the economic assessment commissioned by the project proponents are not accurate. Their prediction of a mild positive impact on agriculture is contradicted by local experience and the results of more realistic modelling approaches.

Other externalities

A number of other external costs of the project are inadequately assessed in the economic assessment.

Ecological impacts

The cost benefit analysis includes no value for impacts on the ecology and biodiversity of the area beyond those budgeted for environmental offset projects, stating:

> *Some loss of values but offset. Cost of biodiversity offset included in development costs and operating costs. (p20)*

The assumption behind the zero value given to ecological damage beyond the cost of mitigation measures is explicitly stated by Professor Jeff Bennett in his review of the economic assessment, included as an attachment on p58:

> *A key feature of the benefit cost analysis is the use of costs of offsetting arrangements to reflect the costs of the environmental damage expected from the mine. This approach assumes that the offsets established are perfect substitutes for the assets that are damaged.*

This assumption of perfect substitution is clearly unrealistic and is rejected by ecologists. (Bekessy et al. 2010) outline the positions taken by most ecologists:

- that offsetting destruction of one area of habitat by increasing the protection of another area is inappropriate and results in a net loss of biodiversity;
- that replanted and restored offset areas can take a long time to mature into the functioning ecosystems they are supposed to replace, meaning a loss of ecological function for long periods, if not forever.

It is not only ecologists who dispute the idea of perfect substitutability of biodiversity offsets. In the recent judgement on the Warkworth Coal project, Justice Preston found that the mine's offset package, also approved by the NSW Planning Department was inadequate to compensate for its impacts (see Preston 2013).

It is also worth noting that the proposed offset package does not meet the offset standards of the local catchment management association.

Clearly there will be loss of sensitive ecological values. Environmental and ecological economics have many tools to estimate such values for inclusion in cost benefit analysis. This should have been done in this case and their omission serves to overstate the value of the project.

Aboriginal heritage

Similarly, the cost benefit analysis places no value on impacts the project will have on Aboriginal beyond costs involved in mitigation. This relies on the perfect substitution of Aboriginal heritage offsets to offset this damage. We understand this is disputed by parts of the local Aboriginal community. Failure to acknowledge this impact serves to overstate the value of the project.

Health impacts

No consideration is made in the economic assessment of the impacts of the project on human health. This is inappropriate given the increasing body of research linking and quantifying the damage of coal mining and transport on health. Open cut coal mining, transportation of coal in uncovered wagons, coal loading and unloading facilities all create particulate pollution that can affect human health, reducing our productivity and increasing health costs. A well known study in the *American Economic Review* (Muller et al. 2011) found that in the USA the effects of coal mining and coal fired power on health outweigh the industry's value of production:

> *The largest industrial contributor to external costs is coal-fired electric generation, whose damages range from 0.8 to 5.6 times value added.*

This study is not alone. Other American researchers in the Appalachian region (Hendryx & Ahern 2009) found that the health costs associated with coal mining in that region from 1979 to 2005 ranged from $18 billion to $86 billion, while the financial benefits of the industry had been only $8 billion. The study concluded:

> *The human cost of the Appalachian coal mining economy outweighs its economic benefits.*

Australian research in this area is less advanced, but supports these general findings. In a submission to the Senate Committee Inquiry into the Impacts of Air Quality on Health, a University of Newcastle researcher has applied the results of research into the costs of air pollution in Sydney's Greater Metropolitan Region to the predicted air quality impacts of a coal project on the Hunter region. This analysis finds that air pollution in the Hunter causes annual health costs of approximately $1,766 million and that a proposed coal export terminal project would increase this cost by approximately $29 million ((HCEC 2013) based on (DEC NSW 2005)).

Even if the project manages to stay within prescribed guidelines on particulate pollution, medical studies conclude that there is no threshold level below which health is unaffected by some pollutants. People with heart and lung conditions, respiratory infections, asthma, infants and the elderly are vulnerable to even very low levels of exposure to particulate pollution. In reality, exceedances of air quality guidelines is routine - a recent study by (CTAG 2013) found that although particulate pollution guidelines allow for five exceedances of average levels per year, they recorded thirteen in less than four months.

By not including an estimate of impacts on health, or by assuming that compliance with guidelines ensures a zero impact, the economic assessment overstates the value of the project. This is inappropriate given the high costs of health impacts identified in overseas studies and recent findings in NSW.

Greenhouse gas emissions

The economic assessment includes only values for the damage caused by greenhouse gas emissions associated with the mining and transport of coal to port. If the project is successful in selling the vast majority of its product coal into metallurgical coal markets, this may be an appropriate approach. However, as noted there is potential for much of the product coal to be sold into thermal coal markets where, by expanding the supply of coal and reducing its price, this project will be responsible for increasing the amount of coal consumed in the world by a small quantity. The

emissions associated with this increase should be included in cost benefit analysis of this project. Failure to do so would overstate the benefits of the project.

Social value of employment

The cost benefit analysis includes a value of $324m for social value of employment. This supposes that the public places a value on these jobs over and above what they are paid in wages. A similar value was used in the assessment of the Maules Creek project. The proponents of the Maules Creek Coal Project commissioned Professor Jeff Bennett of the Australian National University to review the economic assessment of that project, also by Gillespie Economics, which also included a "social value of employment". In relation to the inclusion of this value, Professor Bennett said:

> *[The] EIA's inclusion of benefits associated with employment [is contentious]. The argument advanced is that people outside of the mine workforce enjoy benefits associated with people having jobs in the mine. The values of this 'existence benefit' of work estimated for the case of a mine in the southern coal field are 'transferred' to the current case. A number of points argue against this approach. First, there is a conceptual issue. In a fully employed economy, it is doubtful that people employed in the new mine would be drawn from the ranks of the unemployed. So people outside the mine are unlikely to hold any existence benefits for the jobs provided by the mine in that case. Second, there is an estimation issue concerning the use of a benefit estimate transferred from another context. The conditions in the southern coalfield – the context of the source of the benefit estimate are very different from the proposed mine context….. [The] inclusion of the employment benefit as a component of the EIA is not recommended. Their inclusion would overstate the extent of proposal benefits. (Bennett 2011)*

Professor Bennett is not alone in his criticisms of Gillespie Economics' use of a social value of employment. Another prominent academic has criticised it, John Quiggin (2012), as has the executive director of The Australia Institute (Denniss 2012) and leading private sector consultants (Deloitte Access Economics 2012). With so many high-profile economists opposed to the inclusion of this value in assessments of coal projects, it is a source of considerable concern to us as to how Gillespie Economics can continue to incorporate it. We call on Gillespie Economics to desist from including this discredited value in their work entirely.

Noise, dust, air quality, vibration, amenity impacts

All of these impacts are assigned zero values beyond the cost of mitigation measures which are incorporated into the capital costs of the project. Gillespie Economics consider that land acquisition largely offsets these impacts within the affected zone:

> *Noise costs, air quality costs and agricultural production costs will occur at a local level. These have been incorporated into the estimation of net production benefits via acquisition costs for affected properties and mitigation cost. As such, the bearers of these costs are compensated.*

This implies that the acquisition process proceeds smoothly and without controversy. However this is rarely the case with disagreements over acquisition programmes common in NSW at the moment. The CCAG, for example, argues that acquisition rules are unfair because they only mandate

acquisitions when *dwellings* are located within the zone of acquisition. Farm land which is located within the zone acquisition may not be acquired, but its value could potentially be impacted. Furthermore, while Gillespie Economics do acknowledge "that there may also be some consumer surplus losses to these property owners above and beyond changes in property values," the euphemism of consumer surplus disguises the real personal and social cost of the acquisition programmes.

Gillespie Economics consider that there is no need to value impacts on the community outside the affected zone, provided they remain within legislated guidelines. This is inappropriate as compliance with guidelines does not mean community welfare is unaffected in these areas. Local people who are affected by these impacts, but are not compensated for them, incur economic costs of this project. Failure to acknowledge such impacts and estimates serves to overstate the value of the project.

Conclusion

The socio-economic assessment of the Watermark Coal Project is not suitable for decision making in its current form. It fails to clearly demonstrate the economic benefits of the project to Australia, overstating the financial case for the project, while understating impacts on agriculture, environmental and health. It is not clear that the project represents a net present benefit to the community.

Key issues that need to be considered include:

- The assessment relies on the proponent's unsourced forecast of semisoft coking/PCI coal prices of AUD$142. This is substantially above other analysts' estimates.
- The assessment assumes the project will be able to sell 86% of its production into this market. Historically, much PCI coal is not able to be sold into metallurgical coal markets and is instead sold as thermal coal.
- Royalty revenue is the most important benefit from the project for decision makers to consider. The assessment seems to overstate royalty revenue in present terms by $82m. The assessment's royalty calculations are not transparent or adequately explained.
- Estimates of tax revenue in the assessment rely on high prices and theoretical company tax rates rather than the effective tax rates that mining companies in Australia face. This serves to overstate the likely tax revenue by around $700m.

We estimate the benefits to Australia of the project are around $541m. The economic impact assessment and cost benefit analysis do not present an accurate picture of the negative impacts of the project that need to be considered and could well outweigh this financial benefit. Negative impacts include:

- Impacts on agriculture due to increased cost and reduced availability of:
    - Labour
    - Water
    - Freight
    - Impact of air quality and coal dust
- Impacts on external costs such as:
    - Ecology, including threatened species and ecosystems
    - Aboriginal heritage
    - Human health
    - Greenhouse gas emissions – particularly if production is eventually sold into thermal coal markets
    - The assessment includes a misleading value on the social benefit of employment which has been widely criticised and is not included in standard cost benefit analysis.

In conclusion, the Watermark project is not accurately presented in the economic assessment. The economic case for the project has been overstated, while its social and environmental costs have been understated. Without considerable revision it is not clear that the project represents a benefit

to the NSW or Australian community and should therefore be rejected.

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