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# Report on proposed Watermark Coal Project

June 2014

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## Executive summary

The economic and agricultural assessment in the Environmental Impact Statement (EIS) for the Watermark project is flawed. It is based on biased modelling techniques and ignores the risks the project presents to the region's agricultural industry. The financial benefits of the project have been overstated and costs understated. The project will not return a net economic benefit to the New South Wales Community.

### Flawed modelling

Input Output modelling was used to give a biased impression of the project's economic impacts. This type of modelling has been rejected by recent Planning Assessment Commission reviews as well as the NSW Treasury, the Australian Bureau of Statistics and the Productivity Commission. Key flaws in the model include:

- Assumptions of unlimited water, labour and land
- Assumption of fixed prices
- No consideration of agricultural impacts

The results of this modelling are unreliable as they are certain to overstate positive impacts.

### Impacts on agriculture ignored

Both the economic assessment and the Agricultural Impact Assessment assume there will be no impacts on agriculture outside of the project area and its biodiversity offset area. All agricultural impacts are assumed to be costed in through acquisition of the land for the project. Expert opinion and submissions from local stakeholders reject this position, particularly in relation to impacts on water resources. Expert review has concluded that the EIS groundwater assessment is unreliable.

Agricultural data in the EIS is outdated. It was collected in 2005-06, predating major water reforms. These reforms reduced groundwater entitlements in the area by 67 per cent, driving huge investment in water efficiency and wider agricultural reform. The EIS fails to incorporate these recent changes in its assessment and as a result:

- Does not consider the risks of the project to the \$1 billion of investments the region's 249 irrigation businesses have made in irrigation infrastructure and capital equipment.
- Does not consider the reduced land values of groundwater dependent properties.
- Does not consider the increased returns of irrigation as a result of this investment. Irrigation increases regional income by approximately \$40 million per year.
- Does not consider the reductions in spending in the wider economy that would come with impacts to irrigation. Irrigation boosts spending by around \$25 million per year in the local economy.

### Cost benefit analysis not credible

Key assumptions in the cost benefit analysis of the project are unrealistic:

- Coal prices used are 30 per cent above current levels and over 20 per cent above long term averages.
- No allowance for capital cost overruns are made – average cost overrun has been over 50 per cent in the last two years.

- Operating costs used are 20 per cent below Australian averages.

We have re-run the cost benefit analysis using more realistic assumptions, which results in a substantial reduction in project value, summarised below:

### Sensitivity testing of financial net present value

	EIS	Central	Low
<b>Revenue</b>	\$8,147	\$6,236	\$5,888
<b>Capital costs</b>	\$1,480	\$1,850	\$2,220
<b>Operating costs</b>	\$3,620	\$4,120	\$4,642
<b>Net Present Value</b>	\$3,047	\$266	-\$974

Assumes 7 per cent discount rate over life of project and production schedule from EIS

Under these more realistic scenarios:

- The project will be unable to pay required royalties and remain viable
- No federal taxes would be paid

### Coal industry presented in misleading way

The Department of Planning and Environment's Environmental Assessment Report (EAR) overstates the economic importance of the coal industry in setting the context for the assessment. Contrary to widely held views:

- The NSW economy is focused on services - the coal industry contributes only 2-3 per cent of gross state product.
- Coal is not a large employer – less than 1 per cent of the NSW workforce works in the coal industry. The Liverpool Plains is similar, with only 2 percent.
- Coal royalties contribute only 2 per cent of NSW government revenues.
- Coal has been declining as a portion of domestic electricity generation and many analysts consider global markets to be declining.
- Creating long-lived coal projects works against climate change policy.

### Watermark project will produce net economic loss to NSW

There is currently considerable controversy over the way economic assessment of coal projects is carried out in NSW following rejections of proponent's claims by PACs and NSW courts. The Watermark EIS economic assessment has been prepared by the same consultancy responsible for most of these controversial assessments.

Like those projects, the Watermark assessment understates the project's costs and overstates its benefits. The assessment does not make clear that any modest financial benefits of the project will largely flow to overseas owners, while the impacts on agriculture and the environment will be felt by the local community. The project will not return a net benefit to the NSW community and should be rejected on this basis.

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## Introduction and scope

The Australia Institute has been commissioned by the Carroona Coal Action Group (CCAG) to review and assess the economic analysis prepared in support of the Watermark coal project.

In preparing this report we considered:

- Director General's Environmental Assessment Requirements (DGRs) for the Watermark Project.
- Environmental Impact Statement (EIS) Appendix AF – Economic Impact Assessment, prepared by Gillespie Economics, dated October 2012.
- EIS Appendix Z – Agricultural Impact Statement, prepared by Scott Barnett and Associates, dated February 2013.
- Submission by CCAG to the EIS, particularly the submission's economic section, prepared by Economists at Large, dated April 2013.
- Response to Submissions (RTS) on the EIS, prepared by Hansen Bailey, dated November 2013.
- The Environmental Assessment Report (EAR), prepared by the NSW Department of Planning and Infrastructure (the Department), dated May 2014.

Our report is also informed by interviews conducted in the region in May 2014.

The report is divided into four broad parts:

- Input Output modelling – this form of modelling is given emphasis in the assessment, but it is not a suitable method for project evaluation.
- Agricultural impacts – agricultural impacts have been omitted and inadequately assessed in the EIS.
- Cost benefit analysis – this important part of project evaluation has not been conducted rigorously. It overstates the project's benefits and understates costs.
- Strategic context – Section 3 of the EAR discusses the context of the NSW coal industry and economy. This section appears to be based on secondary research conducted by the Department, rather than other documents in the assessment process.

## Focus on input-output modelling

In its Environmental Assessment Report, the Department places disproportionate emphasis on results from **flawed Input-Output (IO) modelling in the EIS economic assessment**:<sup>1</sup>

*[The] project is predicted to generate very significant benefits to the regional economy, including over 1,000 jobs and almost \$1 billion in annual business turnover.*<sup>2</sup>

The Department reproduces the EIS's entire IO model results in the EAR (p112), perhaps not realising that these results were revised downwards by the proponents in the RTS, reducing the size of the predicted impacts from what the Department quotes.<sup>3</sup>

Regardless of which of the proponent's modelling exercises the EAR includes, **IO models are not a suitable method for project evaluation, due to the assumptions inherent in the model**. Two key assumptions that make IO inappropriate for this purpose are:

- **Assumption that there is unlimited labour, land, water and other inputs**
- **Assumption that these resources will be available at fixed prices**

These assumptions lead to the flawed result in the EIS economic assessment that the Watermark proposal would benefit agriculture in the region. The EIS economic assessment, page 38, Table 3.8, shows **IO modelling results suggesting that the project would increase regional agricultural employment by 7 jobs. This is clearly implausible** and is a result of the flawed assumptions in the model. Three case studies presented in this report show that **the project will reduce the amount of land, labour and water available to agriculture and drive up their prices**.

IO modelling has recently been rejected by the PACs for the Stratford and Wallarah 2 projects<sup>4</sup>: The Stratford PAC stated:

*The adequacy of these methodologies for providing a properly balanced view of the potential costs and benefits of the project has come under serious and sustained criticism from economists, the judiciary, public authorities and a major economic consultancy firm. These criticisms include, inter alia, use of the Input - Output (IO) modelling to produce employment figures, .... These are not 'arguments about the details of the economic assessment'. They are fundamental criticisms of the basis for the assessment.*<sup>5</sup>

These PACs noted that proponents used these models:

*despite knowing that the claims are almost certainly grossly exaggerated.*<sup>6</sup>

The RTS defends the use of IO modelling by claiming to be:

*Consistent with the Draft Guidelines on Economic Effects and Evaluation in Economics Impact Assessment (James and Gillespie, 2002)*<sup>7</sup>

<sup>1</sup> (Gillespie Economics, 2013) p24-40

<sup>2</sup> EAR p3 These results are repeated in the brief economics section of the EAR and in its conclusion.

<sup>3</sup> (Hansen Bailey, 2013) p605-611

<sup>4</sup> (PAC NSW, 2014b)

<sup>5</sup> (PAC NSW, 2014a) p63

<sup>6</sup> (PAC NSW, 2014a) footnote on p67

The Stratford PAC dismisses this defence:

*From the Commission’s perspective the criticisms [of IO modelling] appear sound and the issue of whether the analysis complies with guidelines that have been in draft since 2002 is largely irrelevant. The Commission’s task in this context is to assess the merits of the project (see TOR 2) and that involves in part an assessment of the costs and benefits of the project based on an assessment that is factually and methodologically robust.<sup>8</sup>*

The Stratford and Wallarah 2 PACs are supported by NSW Treasury’s *NSW Government Guidelines for Economic Appraisal*, which require “extreme care” in interpreting the results of IO modelling,<sup>9</sup> emphasising:

*[IO] Model based Economic Impact Assessment is not a substitute for a thorough economic analysis of a policy. The appropriate method for analysing policy alternatives is benefit cost analysis.<sup>10</sup>*

Similar positions have been adopted by the NSW Land and Environment Court<sup>11</sup>, NSW Supreme Court<sup>12</sup>, Land Court of Queensland<sup>13</sup>, the Productivity Commission<sup>14</sup>, the Australian Bureau of Statistics<sup>15</sup> and many prominent economists<sup>16</sup>.

Assessment of the full costs and benefits of the Watermark proposal shows that the project will create significant costs to agriculture through its impacts on vital inputs such as groundwater, surface water and agricultural land.

## Impacts on agriculture ignored in EIS

While IO modelling is structurally certain to ignore the impacts of the Watermark project on agriculture, the cost benefit analysis in the **EIS cost benefit analysis also ignores agricultural impacts**. It includes a zero value for costs to agriculture other than the costs of acquiring the project land, explaining:

*The present value of foregone agricultural production is reflected in land prices. The value of foregone agricultural production, as a result of the Project, has therefore been incorporated in the BCA through inclusion of the full land value (opportunity cost) of affected properties.<sup>17</sup>*

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<sup>7</sup> (Hansen Bailey, 2013)p584

<sup>8</sup> (PAC NSW, 2014a) p64

<sup>9</sup> (NSW Treasury, 2007) p17

<sup>10</sup> (NSW Treasury, 2009) p4

<sup>11</sup> (Preston, 2013)

<sup>12</sup> (NSW Supreme Court, 2014)

<sup>13</sup> (Smith, 2014)

<sup>14</sup> (Gretton, 2013)

<sup>15</sup> (ABS, 2011)

<sup>16</sup> (For example Abelson, 2011; Denniss, 2012; Layman, 2002 )

<sup>17</sup> (Gillespie Economics, 2013) p14

Similarly, the economic and agricultural assessments base their consideration of the impacts on water as:

*Annual average relocation of approximately 257 ML/year of water from agricultural purposes to coal mining purposes. This level of annual water requirement implies that potentially 37 ha of cotton would be converted from irrigated to dryland production.<sup>18</sup>*

Aside from this minor reallocation of water markets, the **EIS economic assessment and Agricultural Impact Assessment focus entirely on the land directly impacted by the project and its offset sites, and make no consideration of wider impacts to agriculture.**

**Impacts outside the actual project area are dismissed entirely:**

*The Project will not have any impact on the alluvial soils or agricultural productivity of land outside the Project Area and the Biodiversity Offset Areas.*

*Other potential impacts on agricultural resources and enterprises within the locality, including air quality, noise, soils, traffic and transport, visual, labour supply, have been assessed as having a minimal effect.<sup>19</sup>*

The Economic and Agricultural Impact Assessments' approach that there will be "minimal" impacts on agricultural resources and enterprises outside the project area is rejected by expert opinion presented by CCAG and other submissions. The approach adopted in the EIS is in opposition to the DGRs which require:

*specific focussed assessment of the impacts of the proposal on strategic agricultural land:*

By ignoring impacts on surrounding areas the EIS does not provide relevant information for the PAC to address with confidence its terms of reference:

*Particular attention to the impacts of the project on strategic agricultural land...including the impacts on existing agricultural land use in the areas surrounding the project.*

**By ignoring impacts outside the project area, the EIS economic and agricultural impact statements radically understate the impacts of the project.**

## **Agricultural importance of the area ignored in EIS**

The Strategic Regional Land Use Policy for the New England and North West Region makes clear the **importance and uniqueness of the area for agriculture:**

*The Southern Plains area has the highest agricultural productivity in NSW, with an exclusive combination of volcanic soils, rainfall reliability, climate (sunshine hours, moderate temperature and protection from hot westerly weather) and availability of surface and groundwater.*

<sup>18</sup> Gillespie Economics 2012, *Economic review of potential Agricultural Impacts of Shenhua Watermark project*. This report appears as Appendix 7 of the EIS Agricultural Impact Statement, itself Appendix Z of the EIS, (Barnett, 2013).

<sup>19</sup> (Barnett, 2013) page iv

*The black earth and chernozem soils found in the Liverpool Plains are classified as some of the most fertile in Australia. These fertile soil types are rare in Australia, making up less than 1 per cent of the nation's surface area. The major concentrations are found in the Liverpool Plains and the Darling Downs and central highlands of Queensland.<sup>20</sup>*

Neither the EIS agricultural impact statement nor economic impact statement make mention of the area's particular uniqueness, with the Agricultural Impact Statement mentioning only on p42 that the area is "highly prized for cropping".

### EIS agricultural data is outdated and ignores Water Sharing Plan reforms

The data used in the EIS comes from the 2005-06 ABS Agricultural Census. It is unclear why the 2011 Agricultural Census data was not used. The first consequence of using out-of-date data is that the EIS understates the value of agricultural production by more than 20 per cent, as shown in Table 1 below:

**Table 1: Gross value of agricultural production 2006 and 2011**

Enterprise	Gunnedah LGA (\$m)	Liverpool Plains LGA (\$m)	Liverpool Plains and Gunnedah region (\$m)
Gross value of agricultural production 2006	125.5	156.6	282.1
Gross value of agricultural production 2011	206.8	155.0	361.8

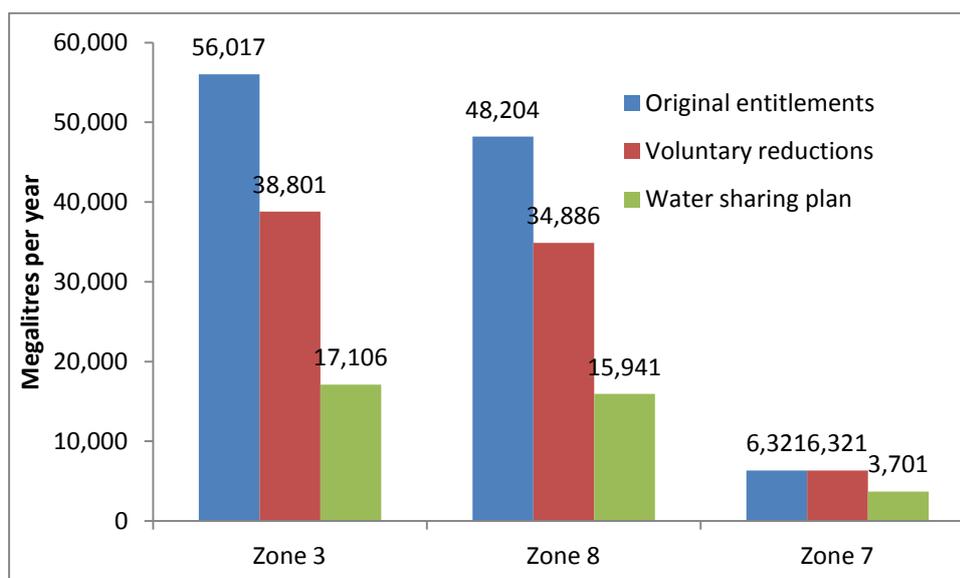
Source: ABS Catalogue 7503.0 Agricultural Census 2011, EIS appendix Z, Agricultural Impact Statement, p44

More importantly, the EIS ignores the major reforms the Liverpool Plains' irrigation sector has undergone in the years since the EIS data was gathered. **The *Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003* commenced on 1 November 2006, after the data used in the EIS was collected.<sup>21</sup>** Under the Water Sharing Plan, groundwater allocations in the zones affected by the Watermark project have been reduced by an average of 67 per cent, as shown in Figure 1 below:

<sup>20</sup> (NSW DPI, 2012) p16

<sup>21</sup> <http://www.water.nsw.gov.au/Water-management/Water-sharing-plans/Plans-commenced/Water-source/Upper-and-Lower-Namoi-Groundwater-Sources#info>

**Figure 1: Groundwater allocations in Zones affected by Watermark project**



Source: (CARE, 2003)

The change has driven around \$1 billion dollars in investment in water efficiency and reform of the local agricultural economy, as is made clear in the following three case studies, based on interviews in the Liverpool Plains region in May 2014.

### Case study A

Case study A is of a major irrigation and dryland farming operation, farming an area of 6400 ha, 1400 of which is irrigated, with plans to increase to 1600 hectares in the near future. They have current groundwater allocations of 2896 ML.

Their business strategy since the Water Sharing Plan has been to maximise returns from water assets, so all irrigation has been converted from flood irrigation to overhead sprinkler systems. This conversion has come at a cost of \$3 million through investments in centre pivot watering systems. This has led to savings of up to 50 per cent in water use per hectare, at the same time increasing yields. The system allows them to apply water with maximum efficiency through automated processes.

Other major investments related to water reforms include:

- Purchase of a cotton picker and associated row crop equipment valued at over \$1 million.
- \$500 000 on removal of inefficient equipment and structures
- Planters with swath control
- Maintenance of 5 houses on the property for employees

These investments were financed through a mixture of 50 per cent debt and 50 per cent equity based on the secure, long-term returns that sustainably managed irrigation provides.

The business employs 10 people year round and more at other times. This would likely reduce to 5 people with any reduction in water allocation.

The uncertainty of the water impacts of the Watermark project is already having an effect on their business according to managers:

*The real threat from both the Shenhua project and the BHP project is the unknown. With heavy reliance on irrigation water from underground sources, if those aquifers are damaged in any way, what is the comeback from mining companies? When we are irrigating we pump just on 50 megalitres per day. To replace that in truckloads is impossible. Assuming a water truck carries 40,000 litres per load, that is 1250 truckloads per day. This year our bores ran non-stop for 60 days, which would equate to 75 000 trips. Without our water we lose the resilience of our business.<sup>22</sup>*

Further:

*Irrigation water, grain storage, good soil and proper management allows this business to make decisions to drive towards its long term goals. Any impact on our water, and remember we had to buy it, nurture it, use it wisely and manage our way through government intervention, would have a significant effect on our decision making and profitability.*

## Case study B

Case study B is of another major irrigator and dryland farming operation, farming an area of 3,012 ha, 1,040 ha of which is irrigated. Like most of the growers the area, they lost 68 per cent of their groundwater allocation under voluntary agreements and the Water Sharing Plan.

Over ten years they have been adjusting to the sustainable water allocation using various measures. They invested heavily in water efficiency and storage including:

- Water storage of 660 ML at a cost of around \$1 million.
- Extension of other water storage, at a cost of \$400,000.
- Laser levelling of all 1,040 ha of irrigated land, at a cost of around \$470/ha - over \$480,000.

Other capital investment to maximise the value of their irrigation assets include:

- New river pump to capture Namoi free flows at a value of \$300,000

These investments were financed through a mixture of 30 per cent debt and 70 per cent equity. They believe farms with a greater area of irrigation operate at higher levels of debt due to the security of income that irrigation provides:

*Irrigation is certainty, or at least as close to it as farming income gets. The difference in margin between irrigated cotton and dryland cotton is between one third and two thirds lower. But more important than the difference in margins is the variability and risk that dryland farming exposes you to. Everyone's capital structure is based around their exposure to these risks.*

This business employs 6 full time staff in addition to 2 full time managers. Any reduction in water allocation would reduce employment as irrigated farming is relatively labour intensive.

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<sup>22</sup> All quotes in case studies are based on interviews in May 2014

## Case study C

Case study C is a major irrigator, farming an area of 1,500 ha, 960 ha of which is irrigated. Prior to the implementation of the Water Sharing Plan their water rights and allocations were 3,900 ML. Under the Water Sharing Plan this has been reduced by 2450 ML, or about 63 per cent.

Adjusting to the Water Sharing Plan involved significant changes to their farming practices and business model. They converted 250 hectares from irrigation to dryland cropping and invested heavily in water efficiency and other capital improvements to ensure the long-term environmental sustainability and financial viability of their business. Investments included:

- Water storage of 1,400 ML at a cost of \$1.4 million.
- Laser levelling of 361 ha at a cost of \$170,000.
- Tail water return system and 450 ML water storage at a cost of \$1.1 million.
- Improved design and maintenance of 38km of channels and return drains.
- Latest technology moisture monitoring and water scheduling systems.

Other capital investment to maximise the value of their irrigation assets include:

- Investment of over \$1m in a specialised cotton picker to maximise the area and efficiency of their irrigated cotton operation.
- Investment in precision agricultural technology and farming implements to improve soil moisture retention.

The business employs 2 people in management and 4 farmhands year round and 3 casual staff at other times.

They believe the Watermark project is already having an effect on the value of their business, saying:

*The Shenhua Watermark project has already influenced the value of our property and business. Knowing that a coal mine could be digging and blasting near the aquifers that we rely on has reduced the number of potential buyers and investors who are interested in the business.*

The implications of the project for their business have not been properly assessed under the EIS:

*People need to understand that the impacts of this project is not just a matter of doing a bit less irrigation and a bit more dryland farming. Our whole business model, our allocation of land, labour, capital, debt and equity, is all based around our long-term sustainable access to water of high quality. While some assets could be sold, many can't be moved and would become stranded assets. Any threat to our water resources threatens our ability to pay investors and creditors and affects the long-term viability of our business and those of everyone on the Liverpool Plains.*

## Project risks creating stranded assets

According to the 2011 Agricultural Census, the region has 249 irrigation businesses. Based on the investments that the case study businesses have undertaken, it is feasible that **a billion dollars has been invested by these businesses in developing groundwater resources under the Water Sharing Plan.**

These assets are placed at risk by any reduction in groundwater allocation or aquifer drawdown in the region. Not only are the assets themselves at risk, but the returns they contribute are important for paying debt and equity investors who funded these investments. This has serious implications for the local economy.

The effect of reduced water allocation on the value of irrigation investments is well known to the region's economists and to the NSW Government. Prior to the recent water reforms extensive analysis was conducted on:

*The reduction in value of developed irrigation properties resulting from the write off of the value of irrigation infrastructure due to loss of allocation.<sup>23</sup>*

The EIS and RTS fail to take the nature of these investments into account. As discussed above, the EIS considers that irrigation areas will be easily converted to dryland agriculture:

*This level of annual water requirement implies that potentially 28 ha of cotton will be converted from irrigated to dryland production. This represents a loss in cotton production of 140 bales of cotton with a gross value loss of \$104,234 per annum and a net value loss of \$56,809.<sup>24</sup>*

This quote shows that the **EIS fails to comprehend that impacts on groundwater affect the value and viability of investment in irrigation infrastructure.** Investments like laser levelled fields, water storages and others discussed in the case studies cannot be simply moved and sold off to compensate for this change. They become "stranded assets" as they cannot be moved and have lost the basis of their value.

These risks should be considered in the cost benefit analysis of the EIS Economic Impact Assessment as an opportunity cost of capital. While the EIS includes consideration of opportunity cost of capital, it considers this only from the perspective of the proponent:

*No capital equipment that is already owned by Shenhua Watermark will be brought forward into the Project and hence there are no opportunity costs of capital apart from that which is reflected in the prices paid for machinery purchased for the project and thus reflected in the development and operating costs of the Project.<sup>25</sup>*

**The EIS has heavily understated the potential loss of value to agricultural businesses by focussing only on the capital investment of the proponent.**

## Loss of land values ignored in EIS

As many of the capital investments discussed above are immobile, part of their loss of value will be expressed through land values. **The EIS and RTS make no consideration that the land values of properties in the area of a major coal project will be affected,** taking a very narrow view of factors that affect land values:

*The market value of agricultural land reflects the present value of the expected stream of profits from agriculture, including any future potential for the land and the possibility for higher value production. In this regard, the impacts on agricultural land*

<sup>23</sup> (Spackman, 2000) p1

<sup>24</sup> (Hansen Bailey, 2013)p604

<sup>25</sup> EIS appendix AF Economic Impact Statement, p12

*are included in the BCA through the inclusion of land values for land required for the Project.<sup>26</sup>*

**The RTS fails to understand that the project affects land beyond the project area,** through market perception and physical impacts, particularly related to groundwater risks. This is inconsistent with DGRs for the project. Landholders interviewed for this research made clear that valuations of their properties and businesses had already been affected, with a reduced number of potential buyers due to the Watermark Project. This is supported by research from the NSW Valuer General in the Gloucester area, where another greenfield open cut coal mine is proposed:

*Property professionals working in the Gloucester area report that the number of potential purchasers has decreased in the south east Gloucester area where properties are in close proximity to the CSG area and the proposed mine. Agents report that potential purchasers have an aversion to the CSG and mine areas of Gloucester but the main concern is the mine.<sup>27</sup>*

While in Gloucester these price impacts are being driven largely by amenity issues, the same study notes international examples where groundwater impacts are also relevant. While the study is focussed on the impacts of unconventional gas, it is likely that similar impacts would flow from the Watermark project:

*Groundwater contamination concerns for properties that are groundwater-dependent offset gains by reducing these property values up to 26 per cent.<sup>28</sup>*

*The reduction was also larger for properties that are dependent on groundwater resources and for properties surrounded by agricultural lands.<sup>29</sup>*

Clearly, **perceived and actual impacts on groundwater resources have a serious influence on the value of properties which depend on groundwater.** The economic assessment and the Department's EAR does not consider the losses in value that will be incurred by properties which rely on the same groundwater resources that the project impacts upon. This lack of consideration serves to substantially overstate the value of the project whilst understating the financial impact of the project to local landowners..

## Risks to agricultural output ignored

Agribusinesses invest in irrigation infrastructure as the returns to irrigated cropping are several times higher than dryland farming, and are far more reliable. As the EIS fails to consider impacts on agriculture outside the direct project area and 28 hectares of cotton production due to water allocation purchases, it ignores the value of agricultural production which is placed at risk through the project's impact on water resources.

Some indication of this value can be gained by considering the differences in revenue, costs and income associated with irrigation and dryland cropping in the region. In Figures 2 and 3 below, the differences in per hectare revenue, costs and income (gross margin) are shown for irrigated and dryland cotton and wheat:

<sup>26</sup> (Hansen Bailey, 2013) p605

<sup>27</sup> (NSW Valuer General, 2014)p36

<sup>28</sup> (NSW Valuer General, 2014)p9

<sup>29</sup> (NSW Valuer General, 2014)p10

Figure 2: Irrigated and dryland cotton

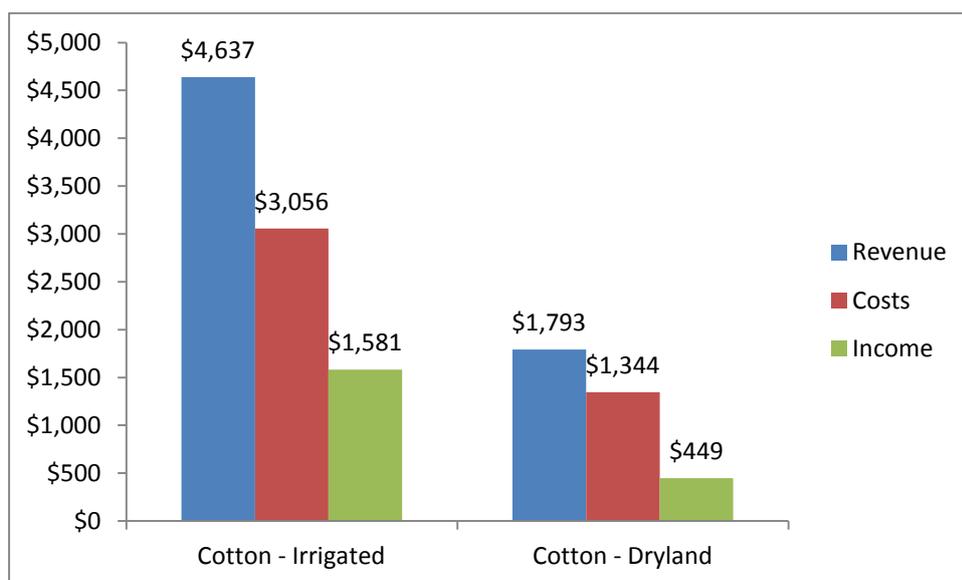
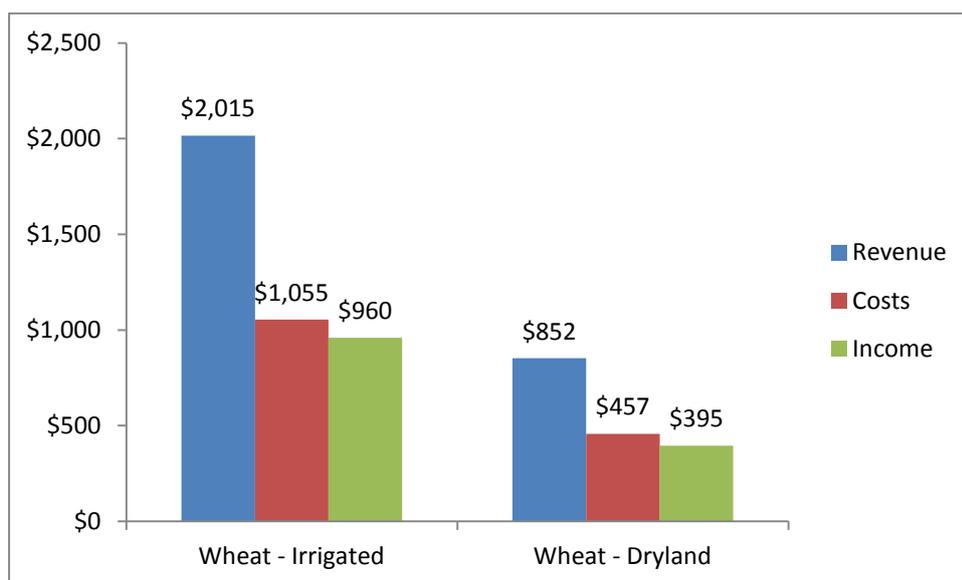


Figure 3: Irrigated and dryland wheat



Source: NSW Department of Primary Industries, 2012, farm budgets and costs, available at <http://www.dpi.nsw.gov.au/agriculture/farm-business/budgets>. Note that these figures depend on varieties, farming methods and the year in question, these figures are used for general approximation.

The economic risk to agricultural production value from the Watermark project can be estimated by comparing the differences in income between irrigation and dryland production. According to the 2011 Agricultural Census, the Liverpool Plains and Gunnedah region has 26,417 hectares of developed irrigation. Applying the differences in income across the irrigated area of the region gives some indication of the benefits to NSW farmers that are placed at risk by the Watermark and other resource projects proposed for the region, as shown in Table 2 below:

**Table 2: Cropping income at risk across affected region**

	Difference between irrigation and dryland income (\$/ha)	Irrigated area in region affected by project (ha)	Irrigation income at risk in region (\$, rounded)
<b>Wheat</b>	\$565	26,417	\$ 14,900,000
<b>Cotton</b>	\$1132	26,417	\$ 29,900,000

Source: ABS Catalogue 7503.0 Agricultural Census 2011, NSW Department of Primary Industries, 2012, farm budgets and costs, available at <http://www.dpi.nsw.gov.au/agriculture/farm-business/budgets>

**Tens of millions of dollars of annual cropping income is at risk from the project** if irrigation areas are forced to convert to dryland cropping. As wheat is a lower value per hectare crop and cotton the highest in the region, a reasonable estimate would be between these figures, around \$20 million.

The effect of irrigation on livestock is also important to consider, as intensive and semi-intensive livestock operations depend on irrigation of fodder crops and pasture. Local stakeholders estimated in interviews that irrigation allows stocking rates twice as high as would otherwise be the case. The 2011 agricultural census reports that livestock production in the region was worth \$82.7 million. Assuming stocking rates 50 per cent lower and income at 50 per cent of revenue, we estimate **income from livestock production worth \$20 million per year is at risk.**

**Considering the risks to both cropping and livestock production, agricultural income of around \$40 million per year is placed at risk by the project.**

### Contribution of agriculture to wider economy not considered in EIS

The risk to capital investments in irrigation development and agricultural income are not considered in the EIS economic assessment's cost benefit analysis. Another factor which should have been included in the economic impact assessment is the role that irrigated agriculture plays in contributing to the wider economy.

In consideration of the risks to agricultural income detailed above, the costs agricultural businesses pay is subtracted from their revenue and only the net income is considered. While these expenses are costs to irrigators, they are revenue to other businesses. These costs are items such as:

- Cultivation
- Sowing
- Crop insurance
- Fertiliser
- Herbicide
- Insecticide
- Irrigation
- Contract harvesting
- Cartage
- Ginning charges (cotton only)

- Levies
- Licence fees
- Consultant fees

These increased expenses to irrigators make a major contribution to agricultural service industries in the region.<sup>30</sup> An estimate of the risk placed on activity in agricultural services businesses in the region can be made by comparing the differences in per hectare costs between irrigation and dryland cropping shown in Figures 2 and 3.

**Table 3: Spending on agricultural services at risk across affected region**

	Difference between irrigation and dryland costs (\$/ha)	Irrigated area in region affected by project (ha)	Irrigation spending at risk in region (\$, rounded)
<b>Wheat</b>	\$598	26,417	\$15,800,000
<b>Cotton</b>	\$1,712	26,417	\$45,200,000

Source: ABS Catalogue 7503.0 Agricultural Census 2011, NSW Department of Primary Industries, 2012, farm budgets and costs, available at <http://www.dpi.nsw.gov.au/agriculture/farm-business/budgets>

We see that **irrigation provides between \$15.8 million and \$45.2 million in annual extra spending in the local economy. This spending is placed at risk by the Watermark project.**

The point of an economic impact assessment is to estimate how costs to one industry impact on other, related industries in the economy. **However, as the IO model in the EIS assumes that there are no impacts on agriculture in the wider area and that there are no limits to the amount of water, land and labour in the economy, it does not include any consideration of the losses to the wider economy that would accompany any reduction in irrigation.**

### Sustainability of irrigation and agricultural economy

As the EIS is based on data that preceded the implementation of the region's main Water Sharing Plan it ignores the major investments made and reforms that the region's agricultural economy has undergone. These investments and reforms were not made for their own sake – they were made to ensure the long-term sustainability of irrigation in the region.

Groundwater allocations are now at sustainable levels. To achieve this, water allocations were reduced by 67 per cent, but due to massive investment and reform the value of agricultural production has grown in the region by 20 per cent, as shown in Table 1. **Irrigated agriculture on the Liverpool Plains is now highly efficient and will provide sustainable, secure returns to local agribusinesses and the wider NSW economy.**

In contrast, returns from the Watermark project have been overstated in the EIS and any benefits are uncertain, as discussed in the following sections.

<sup>30</sup> This list comes from NSW Department of Primary Industries, 2012, farm budgets and costs, available at <http://www.dpi.nsw.gov.au/agriculture/farm-business/budgets>

## EIS cost benefit analysis is not credible

The EIS assessment is based on coal price and cost assumptions which are not credible:

- Coal prices used are 30 per cent above current levels and over 20 per cent above long term averages.
- No allowance for capital cost overruns are made – average cost overrun has been over 50 per cent in the last two years.
- Operating costs used are 20 per cent below Australian averages.

The EIS provides no justification for these optimistic assumptions, so no confidence can be placed in the estimates of the cost benefit analysis. CCAG's submissions questioned the appropriateness of these assumptions, to which the RTS responded:

*The [key assumptions in the cost benefit analysis] were based on a financial analysis of the Project provided in detailed studies for the Project (GHD, 2011)<sup>31</sup>*

The study referred to is GHD (2011) *Watermark Project Mine Feasibility Study Volume F Marketing and Product Pricing*. **This study by GHD is not publically available and has not been made available to CCAG at time of writing.** We are unaware whether this report has been furnished to the Department or the PAC. In any case the lack of transparency on this critical matter poses serious constrains on the transparency of the process and reinforces the lack of confidence in Watermark's economic modelling.

Adjusting the key price and cost assumptions to more realistic levels results in the project being financially marginal and could deliver a present value loss of over \$900 million, as shown in Table 4 below:

**Table 4: Sensitivity testing of financial net present value**

	EIS	Central	Low
<b>Revenue</b>	\$8,147	\$6,236	\$5,888
<b>Capital costs</b>	\$1,480	\$1,850	\$2,220
<b>Operating costs</b>	\$3,620	\$4,120	\$4,642
<b>Net Present Value</b>	\$3,047	\$266	-\$974

Assumes 7 per cent discount rate over life of project and production schedule from EIS

Note that:

- The EIS estimate is based on high coal prices – semi-soft coking coal at \$143 per tonne, no capital cost overrun and operating costs of \$62 per tonne.

<sup>31</sup> (Hansen Bailey, 2013) p581

- The central estimate is based on current coal prices - semi-soft coking coal at \$107 per tonne, a capital cost overrun of 25 per cent and the EIS's upper estimate of operating costs of \$71 per tonne.
- The lower estimate is based on price forecasts at the time of the original CCAG submission - semi-soft coking coal prices of \$100 per tonne, capital cost overrun in line with Australian averages of 50 per cent and average Australian coal mine operating costs \$80 per tonne.

Assumptions around coal prices, operating costs and capital costs are discussed in the following sections.

### Coal prices used in the EIS are overstated

Coal prices used in the EIS were strongly contested in submissions. The EIS used prices of:

- AUD\$142/tonne for semi-soft coking coal and
- AUD\$99/tonne for thermal coal.

These **EIS prices are well above current prices** based on recent reports from Whitehaven coal and the Bureau of Resource and Energy Economics, which show:<sup>32</sup>

- AUD\$107 for semi-soft coking and
- AUD\$83 for thermal coal.

These prices are broadly in line with forecasts from mainstream analysts such as the Commonwealth Bank, which is predicting a long term real price of AUD\$114 for semi-soft coking coal and AUD\$91 for thermal coal. Semi-soft coking coal is not a major traded commodity compared to thermal and hard coking coal and most analysts do not publish long term estimates. Many other analysts, such as the World Bank, are more pessimistic than the Commonwealth Bank.<sup>33</sup>

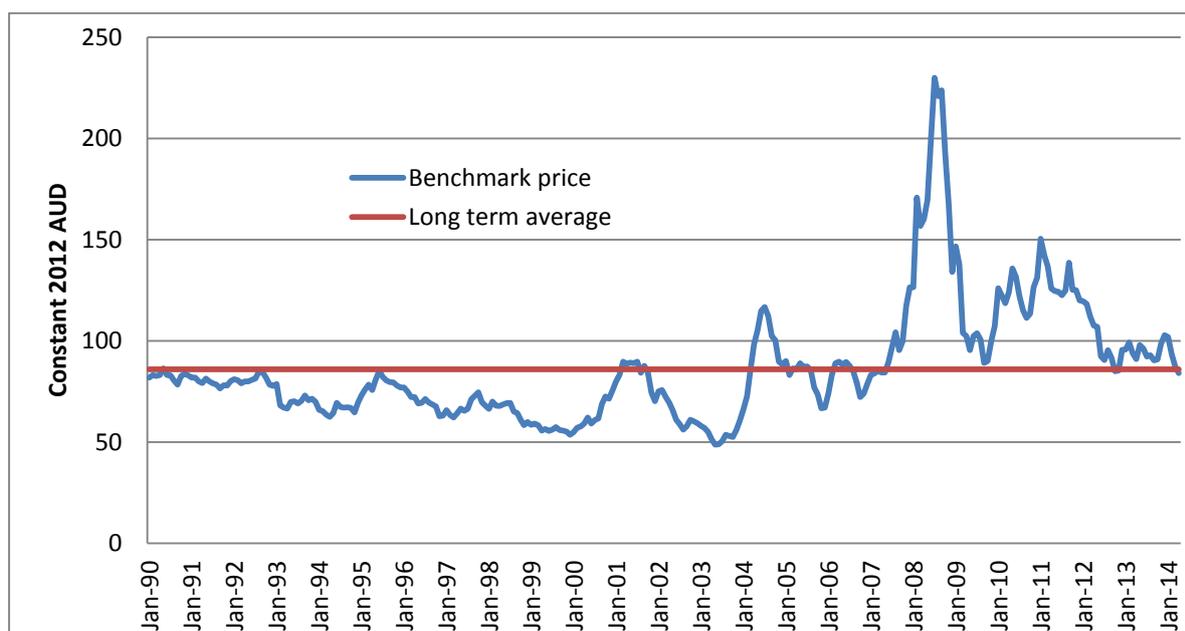
The CCAG submission in April 2013 argued that the EIS coal prices were out of line with analyst forecasts and more appropriate prices were AUD\$100 for semi-soft coking coal and AUD\$95 for thermal coal. The main change since the CCAG submission has been a depreciation of the Australian dollar.

**The RTS concedes that the prices used in the EIS are overstated and cites the source of these estimates as a document which is not publically available, GHD (2011) *Watermark Project Mine Feasibility Study Volume F Marketing and Product Pricing*.** The problem with valuing the project based on a coal price forecast in 2011 is that the coal market peaked in 2011 and has declined to long term averages since then, as shown in Figure 4 below:

<sup>32</sup> Based on semi-soft prices of USD \$101 reported by (Whitehaven Coal, 2014), Thermal prices of USD\$78 reported in (BREE, 2014) and an exchange rate of 0.94 from [www.xe.com](http://www.xe.com). Full working available on request.

<sup>33</sup> (Bernstein Research, 2013; MorningStar, 2014; World Bank, 2014)

Figure 4: Newcastle benchmark thermal coal prices, real (2012 AUD)



Sources: <http://www.rba.gov.au/statistics/by-subject.html>, <http://www.indexmundi.com/commodities/?commodity=coal-australian&months=60>

In 2011, many analysts thought that coal prices were recovering from the global financial crisis and returning to a higher plateau well above long term averages. With the wisdom of an extra three years hindsight, we see that prices have returned to their long term average and seem likely to remain at or below this level for some time.<sup>34</sup>

While GHD's approach may have seemed reasonable at the time, the RTS's claim on this front clearly is not:

*CCAG provided an alternative calculation of the net production benefit of the Project to Australia in its submission. This analysis utilised forecast coal prices from 2012 (when world demand was depressed following the Global Financial Crisis)...*<sup>35</sup>

The RTS seems to confuse the timing of the global financial crisis was and its impact on coal prices. As shown in Figure 4 above, the forecasts made by the Commonwealth Bank in 2012 are likely to have been far closer to long term averages and the current outlook than those of GHD in 2011.

Coal prices and the exchange rate have a huge impact on the value of the project. **Changing the pricing assumptions to realistic levels changes the net present value of the project revenue downwards by over \$2 billion.**

While the Department's EAR makes no mention of coal prices differences, this was a key issue in the recent Stratford PAC review:

*The second main area of concern with the economic analysis concerns the validity of the estimates of economic benefits to be derived from the project. ...the main concern is that coal prices are currently substantially below those used in the economic analysis and current forecasts are that they will remain well below the levels used.*

<sup>34</sup> See for example (MorningStar, 2014)

<sup>35</sup> (Hansen Bailey, 2013) p582

*Since the discrepancy in prices is greater than the sensitivity analysis parameters used in the EIS, the validity of the benefits estimates is doubtful.<sup>36</sup>*

Similarly, the discrepancy in prices between those used in the EIS and current prices and outlook is greater than the 20 per cent change modelled in the sensitivity analysis of the Watermark project. The RTS claims that:

*20 per cent reductions in the assumed coal price over the 30 year analysis period [are] highly unlikely<sup>37</sup>*

**Far from being highly unlikely, price changes are already below this level and are forecast to continue.** See further discussion of sensitivity testing below.

**The overly optimistic estimates of coal prices in the EIS, based on an unpublished source, is a key reason that benefits of the project are overstated in the EIS.**

### **Operating costs in EIS are inconsistent and unrealistically low**

**Operating costs have not been subjected to close scrutiny** in the assessment of the Watermark project to date. The vast bulk of the costs arising from the project are operating costs and estimates used are well below Australian average coal mine operating costs.

Furthermore, the EIS is internally inconsistent with its discussion of operating costs, stating:

*Average annual operating costs (excluding depreciation and royalties) are estimated at approximately \$332 million per annum for the 30 year period.<sup>38</sup>*

However, the present value figure for **operating costs included in the cost benefit analysis is inconsistent with this estimate of annual average operating cost.** The present value figure used is \$3,620 million, while the present value of an annual average of \$332 million is \$4,120 million, **a difference of \$500 million.** This implies that either operating costs are far higher in the later years of the project, or that operating costs have been calculated inconsistently. This must be explained before decision makers can have any confidence in the economic assessment.

Furthermore, these **operating cost estimates seem unrealistically low when considered on a per tonne basis.** Based on the indicative production schedule in the EIS, the project will produce 59 million tonnes of product coal over its 30 year life. For most of this time it will produce at 5.5-6.0 million tonnes per annum.<sup>39</sup> This implies a cost per tonne of AUD\$55-\$62 dollars per tonne. The exact cost per tonne to arrive at the value included in the cost benefit analysis is \$62.39. The analysis assumes this cost can be maintained across the 30 year life of the mine, which is unlikely.

Notably, applying a cost of exactly \$71 per tonne to the production schedule in the EIS results in a present value of operating costs of \$4,120 million – the value suggested by the EIS's claim of annual average operating costs of \$332 million discussed above. Each of these values is substantially below the current average cost per tonne for Australian mines of AUD\$80-85 per tonne.<sup>40</sup>

<sup>36</sup> (PAC NSW, 2014a) p65

<sup>37</sup> (Hansen Bailey, 2013)p578

<sup>38</sup> (Gillespie Economics, 2013)p13

<sup>39</sup> EIS main volume, p36, table 6

<sup>40</sup> (Citi, 2014; Morgan Stanley, 2013)

Changing the assumptions around operating costs per tonne between the EIS estimate and the Australian average as estimated by Morgan Stanley changes the present value of the project by almost \$1 billion. The most likely value for operating costs is between the EIS's higher estimate of \$71/tonne and the lower end of the Australian average range, as investment in new projects tends to be in projects on the lower half of the cost curve. Very few mines in Australia can operate at \$62 per tonne, according to Morgan Stanley.<sup>41</sup> These calculations are summarised in Table 5 below and have been incorporated in Table 4 above:

**Table 5: Changes to NPV with different operating cost assumptions**

	EIS	Mid	Low
<b>Operating costs per tonne (\$)</b>	\$62.39	\$71.00	\$80.00
<b>Present value operating costs (\$m)</b>	\$3,620	\$4,120	\$4,642

Assumes 7 per cent discount rate over life of project. Production schedule from EIS

### Capital costs ignore likely overruns

The EIS provides minimal discussion of capital costs ('capex'), merely stating they are "estimated at \$2 billion". We have minimal confidence in this estimate given recent industry reports that:

*The average capex overrun in the mining industry over the last two years is 56 percent. It is not uncommon for capex overruns to be in excess of 100 percent when markets were running and input factor inflation was strong.*

*These capex overruns occur after the successful completion of bankable feasibility studies that typically state a 10 percent margin of error.<sup>42</sup>*

Adding a capital cost overrun of 50 per cent to the project makes it unviable. We apply a 25 per cent overrun to our central estimate as media reports have reported the capital costs of the project at lower levels.<sup>43</sup> We apply a 50 per cent overrun to our lower case scenario, in line with Australian averages.

### Implications of low net benefit project

As shown in Figure 4 above, **under more realistic coal price and cost assumptions the project is marginal and may lead to a net economic loss.** If the project is financially marginal, there is great incentive for the proponents to lobby for reduced environmental standards and monitoring, which will result in the transfer of costs onto the agricultural industry and the wider community. The ability of the proponents to remediate the site and

<sup>41</sup> (Morgan Stanley, 2013)

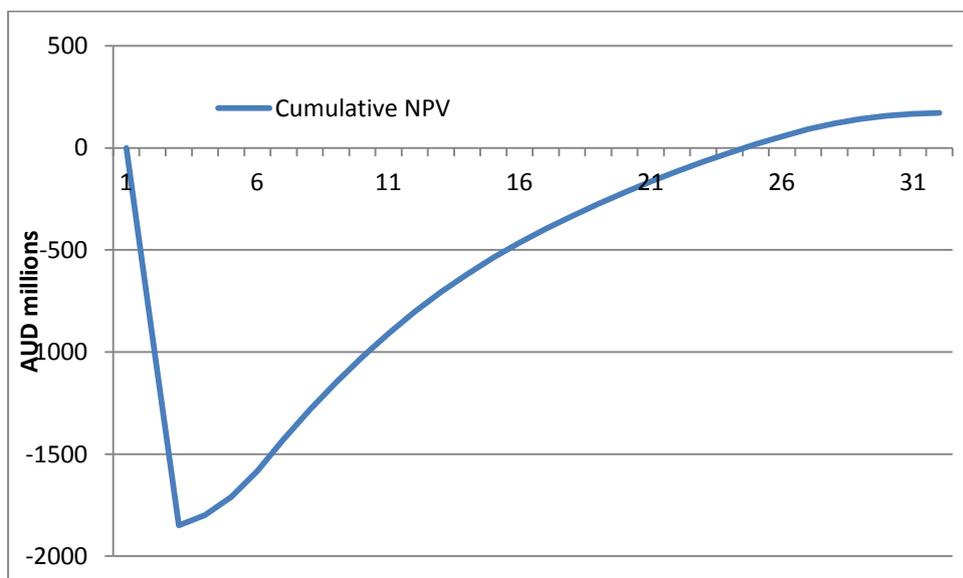
<sup>42</sup> (Koth, 2013)

<sup>43</sup> (Foley, 2013) Note also this article includes estimates of operating costs far higher than discussed above.

provide suitable closure arrangements may be compromised. Given the environmental and agricultural sensitivity of the Liverpool Plains area these considerations are important.

Under our mid case scenario, the **project takes until year 24 to provide a net benefit**, as shown in Figure 5 below:

**Figure 5: Cumulative NPV - central case**



Source: TAI calculations. Note this assumes all capital expenditure occurs in the first two years of the project, which may overstate the present values relative to the EIS.

With considerable uncertainty surrounding coal markets, particularly exports to China, the long pay-off period suggested here should be of concern to stakeholders such as the agricultural sector.

### Project cannot pay royalties or taxes

Coal prices, costs and the project's viability is directly relevant to estimates of royalty and tax revenue. As the Watermark project as proposed is 100 per cent foreign owned, these revenues are the main benefit to NSW and Australia.

The **EIS bases its royalty and tax calculations on unrealistic price and cost assumptions**. Our lower estimates of the project's value is negative, which would not result in any royalty or tax revenue.

Under our central assumptions, the net present value of the project is \$266 million. At this level of net benefit the **project would be unable to pay the required royalties** as calculated in Table 6 below:

**Table 6: Royalty calculations and assumptions**

	EIS	Central estimate
	(\$AUDm)	(\$AUDm)
Semi-soft/PCI price	\$142	\$107 <sup>44</sup>
Thermal price	\$99	\$83 <sup>45</sup>
Exchange rate	0.80	0.94 <sup>46</sup>
Sale value of production (PV@7%)	\$8,147	\$6,236
Applied royalty rate	6.9%	6.9% <sup>47</sup>
Net present value of production costs and benefits	<b>\$565</b>	<b>\$424</b>

As the **required royalties of \$424 million are greater than the net benefit of the project**, the project would be unable to pay these royalties and remain financially viable for investors. This suggests the project would be unable to proceed without modification or a major change in coal markets.

Royalties are deducted before federal taxes are calculated, so under our more realistic scenarios, the **project would pay no federal tax**.

Even under the EIS's unrealistic pricing and cost assumptions, the potential tax revenue of the project is overstated. Mining companies pay lower rates of tax on their gross operating surplus than the standard company tax rate of 30 per cent due to the many deductions available for miners, such as exploration and accelerated depreciation write offs.<sup>48</sup>

The proponent's RTS concedes that the effective tax rate faced is debatable, but argues that the coal mining sector may be different to the broader mining sector examined in the two sources. They provide no evidence or reference for this claim. As the coal mining sector is a substantial part of the Australian mining sector, it is unlikely that its tax treatment would be very different to mining as a whole.

## Sensitivity testing

With more thorough sensitivity testing of the key cost benefit analysis assumptions, the EIS would have given more insight into the financial vulnerability of the project. Our approach of questioning the key variables and considering optimistic and pessimistic scenarios reflects NSW Treasury Guidelines. The **EIS economic assessment cost benefit analysis fails to**

<sup>44</sup> (Whitehaven Coal, 2014)

<sup>45</sup> (BREE, 2014)

<sup>46</sup> [www.xe.com](http://www.xe.com)

<sup>47</sup> Note that the royalty rate is lower the standard open-cut royalty rate due to deductions. In the RTS the proponents explained that their royalty calculations were based on the unavailable study, GHD (2011) *Watermark Project Mine Feasibility Study Volume F Marketing and Product Pricing*. Although not mentioned in the RTS, it is likely that GHD assume that the project will be eligible for a range of royalty deductions relating to beneficiation and various levies such as the Australian Coal Association Research Levy, Mines Rescue Levy and payments relating to long service leave.

<sup>48</sup> (Markle & Shackelford, 2009; Richardson & Denniss, 2011)

**adhere to NSW Treasury guidelines** on how sensitivity testing should be applied to projects:

*While optimistic and pessimistic scenarios should be presented, particular emphasis should be given to the pessimistic alternatives.*

*The aim should be to select a realistic range of possible values for the major cost or benefit variables that could most significantly affect the project outcome....*

*Sensitivity tests on the expected cost and benefit aspects ... 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.<sup>49</sup>*

In contradiction of NSW Treasury, the RTS claims:

*Sensitivity testing of variables in the Economics Impact Assessment by +/-20% is considered an adequate approach, particularly as it relates to a sustained increase or decrease in values over the 30 year life of the Project, rather than more temporary changes.*

*With nine variables subject to individual sensitivity testing by +/-20%, there are 512 possible combinations that could be subject to sensitivity testing. Testing all these combinations is not warranted, particularly if combinations have a low probability of occurrence or information on the probability of occurrence is unknown.<sup>50</sup>*

As discussed above, **several key variables are already at levels more than 20 per cent outside the EIS's estimates**. The RTS is correct that it is not necessary to calculate all possible combinations of all variables in sensitivity testing. It is essential, however, to consider the value of a project with different assumptions on the three most important inputs into the cost benefit analysis – coal price, operating cost and capital cost. **The EIS's failure to conduct this sensitivity analysis makes its results highly misleading.**

### Marketing assumptions

The EIS assumes that the project will produce 85 per cent semi-soft coking coal and 15 per cent thermal coal. As discussed above, the prices assumed for semi-soft coking coal in the EIS are almost 50 per cent higher than for thermal coal. How much coal is marketed at this higher price and how much is marketed at the lower price is clearly another key assumption in the economic assessment of the project – **changing the marketing assumptions by 20 per cent decreases the net present value of the project from the original EIS estimates by AUD\$300 million.**<sup>51</sup>

The RTS says that the source of the marketing assumptions is GHD (2011) *Watermark Project Mine Feasibility Study Volume F Marketing and Product Pricing*, the same document mentioned above which is not publically available and is based on the 2011 coal market outlook. **With several key assumptions of the EIS based on an unpublished document, the PAC can have no confidence in its results.**

<sup>49</sup> (NSW Treasury, 2007) p18 and 23

<sup>50</sup> (Hansen Bailey, 2013) p579

<sup>51</sup> Working available on request

The market for semi-soft coking coal is much smaller and much thinner than that for thermal coal or higher grade hard coking coal. As a result, semi-soft coking coal is often blended with other coals and sold onto lower value markets. Coal companies often disclose how particular mines' products have been marketed as this changes depending on market conditions as well as geology.

For example, Yancoal manages several mines which produce low grade coking coals as well as thermal coal. Their quarterly reports show substantial variation in how their coal is marketed. In December quarter 2013, 50.3 per cent of their production was sold into metallurgical markets. The year before this had only accounted for 39 per cent of sales.<sup>52</sup> Individual mines show even greater variation.

This was noted in the CCAG submission:

*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.<sup>53</sup>*

The RTS acknowledges the lack of consideration of this issue, but is unconcerned by it:

*Changes in the end use of the product may reduce the estimated net social benefit of the Project but would not change the fundamental conclusion that the Project would result in net benefits to Australia.<sup>54</sup>*

As our analysis has shown, the financial benefits of the project have been heavily overstated, even without consideration of agricultural impacts. All key assumptions should be backed by robust data. Criticism should be defended with data rather than claims of insignificance.

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<sup>52</sup> (Yancoal, 2014) see p4

<sup>53</sup> (Economists at Large, 2013) p7. There is also a reference attached to this quote relating to the historical relationship between thermal and coking coal markets – see (Lucarelli, 2011).

<sup>54</sup> RTS p580

## Strategic context section of EAR is misleading

The Department's EAR includes a section (3.1) outlining the "strategic context" of the project, giving a background on the NSW coal industry. Much of the discussion in this section is unbalanced, presenting figures in absolute terms rather than in context.

### Economic significance overstated in EAR

Section 3.1 of the EAR gives a misleading impression of the role of coal in the NSW economy. The coal industry is a relatively small part of the overall NSW economy, as has been emphasised by the head of the NSW Minerals Council:

*Contrary to many misconceptions, mining is actually a relatively small industry in NSW responsible for only 2.5% of Gross State Product.<sup>55</sup>*

The coal industry's contribution to overall state product is modest as the **NSW economy, like most modern economies, is focused on services**. Most of NSW's Gross State Product comes from service sectors like finance (approx 11 per cent), scientific and technical services (8 per cent) and health care (6 per cent).<sup>56</sup>

### Employment

The Department's discussion in the EAR of the economic context of the coal industry and of the Watermark proposal relating to employment is inaccurate and misleading:

*As at June 2011 the NSW coal mining industry employed 21,000 people. The industry indirectly creates up to another 70,000 jobs in mine and non-mine related industries. Many regional towns and communities are dependent on these jobs. p23*

In fact the 2011 ABS census reports that **18,372 people worked in coal mining in NSW, representing less than one per cent of the NSW workforce**. Research shows that even in the Hunter Valley, the centre of the NSW coal industry, only 5 per cent of workers work in the coal industry.<sup>57</sup>

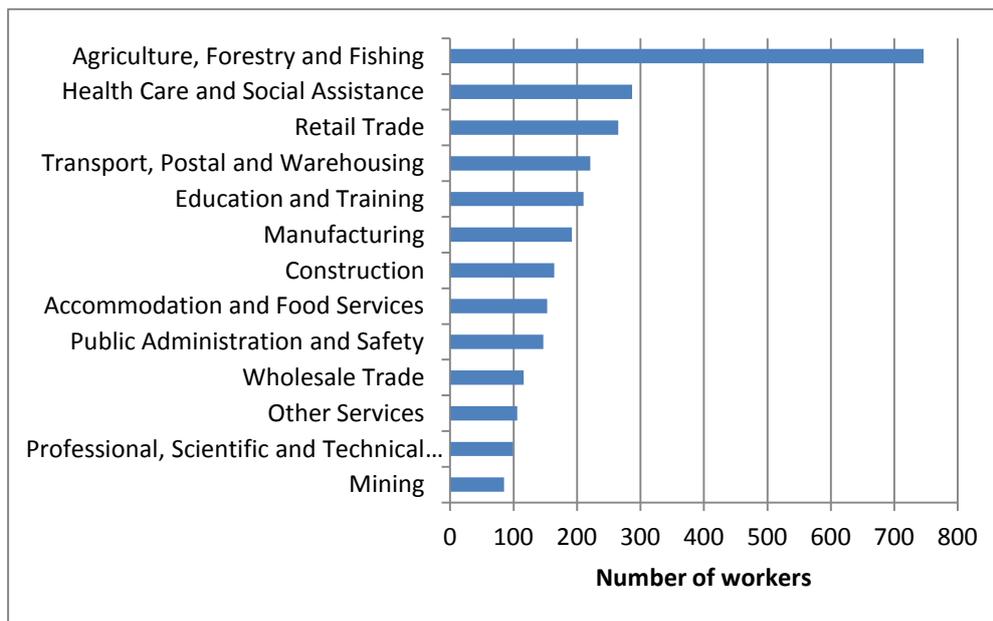
In the Gunnedah LGA Local Government Area (LGA) 6 per cent of workers worked in the coal industry at the last census while in the **Liverpool Plains LGA the coal industry accounted for only 2 per cent of employment** as shown in Figure 5 below:

<sup>55</sup> (Galilee, 2012), although (ABS, 2013) suggests the figure is closer to 3%.

<sup>56</sup> (ABS, 2013)

<sup>57</sup> (Campbell, 2014)

**Figure 5: Liverpool Plains LGA employment by industry at 2011 census**



Source: ABS 2011 census, accessed through TableBuilder

The Department's view that the mining industry also generates 70,000 "indirect" jobs appears to be based on mining lobby group publications rather than on data from more impartial sources.<sup>58</sup> These estimates are based on IO models, discussed above, which present an inflated impression of the industry. As pointed out earlier, their use has been called "biased" by the Australian Bureau of Statistics and they are considered to be regularly "abused" by the Productivity Commission. They have been rejected by the recent PAC on the Stratford Extension Project, the NSW Land and Environment Court and the NSW Supreme Court.<sup>59</sup>

Employment calculations are of limited use because all industries help to create indirect employment. If all industries calculated the indirect jobs they create and added them up, the number of jobs would be many times the size of the actual workforce in Australia.<sup>60</sup>

As discussed above, agriculture also creates indirect jobs. For reasons that are unexplained, the Department's EAR compares agriculture's direct employment to mining's direct and indirect employment:

*Approximately 90,000 people were employed in agriculture, fisheries and forestry in NSW in June 2011, representing approximately 2.5% of the NSW workforce. As outlined in Section 3.1, mining employs about 21,000 people directly, and around 70,000 indirectly. (p25)*

This comparison gives the misleading impression that agriculture and mining are of comparable importance to employment in NSW. This is untrue in NSW as a whole, and particularly untrue in the Liverpool Plains area, as shown in Figure 5 above.

<sup>58</sup> Such a source is (Lawrence Consulting, 2013), which estimates "indirect" employment at 155,000. Other NSW Minerals Council publications put these estimates at up to 290,000 (NSW Minerals Council, 2011), demonstrating the elastic and unreliable nature of these studies.

<sup>59</sup> (ABS, 2011; Gretton, 2013; NSW, 2014; PAC NSW, 2014a; Preston, 2013)

<sup>60</sup> (Richardson & Denniss, 2011)

## Coal royalties a small part of government revenues

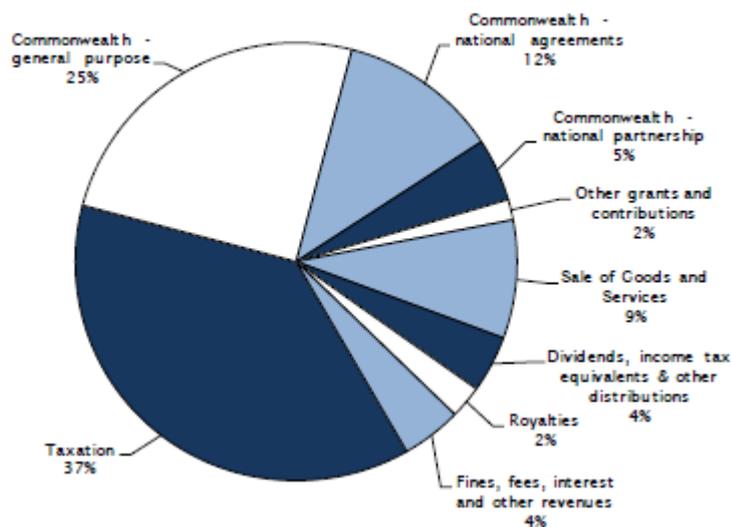
The EAR is similarly misleading on the coal industry's impact on government revenues, listing them as absolute figures, rather than placing them in context:

*Coal mining currently makes a significant contribution to public revenue for the Commonwealth, State and local governments. Royalties to the NSW Government generated from coal and exceeded \$1.2 billion in 2010-11 (p23)*

**In fact, coal royalties account for only around 2 per cent of NSW state government revenue.** Coal royalties are as “significant” to the state government budget as revenue from fines and licences and slightly less “significant” than gambling tax.<sup>61</sup> The vast bulk of NSW government revenue is generated from its diverse, modern economy focused on services, as shown in Figure 6 below:

**Figure 6: NSW state revenues**

Composition of Total Revenue, New South Wales, 2013-14



Source: NSW Budget Papers 2013-14, Budget Paper number 2, chapter 6, p6-9

The coal industry's contributions to federal and local governments are similarly modest when considered as a portion of all revenue. These contributions also need to be balanced against the assistance and subsidies that the industry receives. For example, **over the last six years the NSW government has provided assistance to the mining industry of \$878 million.**<sup>62</sup> **The mining industry as a whole receives over \$4 billion in assistance from the federal government every year.**<sup>63</sup> Local governments often need to fund substantial infrastructure upgrades for coal mining projects, which often cost more than any contributions the benefiting companies make.<sup>64</sup>

<sup>61</sup> (NSW Government, 2013)

<sup>62</sup> (Peel, Campbell, & Denniss, 2014)

<sup>63</sup> (Grudnoff, 2012, 2013)

<sup>64</sup> See for example the debate over the Ulan road upgrade, although in this case further funding was eventually secured from the mining companies involved:

## Exports

The EAR states:

*Coal is also the single largest export in revenue terms from the State, with exports valued at around \$14 billion in 2010-11. This represents around 25 per cent of the State's export revenue. p22*

Coal made up around 22 per cent of international exports from NSW in 2010-11. A larger portion of exports is made up by services, around 31 per cent, particularly travel and business services.<sup>65</sup>

A focus on export revenues is inappropriate as this gives no indication of welfare changes to NSW residents, merely to the volume of exports. This focus considers only if NSW residents would be busier – not if they are actually made better off. As the mining industry is around 83 per cent foreign owned, nearly all profits accrue to offshore interests while little remains in NSW.<sup>66</sup> Shenhua is 100 per cent foreign owned, meaning benefits beyond jobs and royalties will accrue overseas.

Exports to China are highlighted in the Department's EAR:

*China has become an increasingly important market for NSW coal exports in recent years, with exports to the country increasing almost tenfold since 2007-08. Most of the coal produced from the Watermark Coal Project is likely to be exported to China, or to other Asian export markets. (p21)*

The Department has selected financial year 2007-08 as a starting point for its growth estimate. However, that year China imported its smallest amount of Australian coal for several years, only 1.48 million tonnes. Since then it has grown back to, and has begun to exceed, earlier levels.<sup>67</sup>

The reason that Chinese demand for Australian coal fluctuates greatly is well known among coal analysts. China is not only the world's largest coal consumer, it is also the world's largest coal producer. China enters and exits world coal markets opportunistically, buying when imported coal is cheaper than what it can produce itself and exporting coal when prices move the other way:

*Intriguingly, the past few years of heavy coal imports by a coal-rich China may prove to be a historical anomaly. We see potential for China to revert to its status as one of the world's key coal exporters by 2017. Chinese coastal coal is already cheaper than most Australian coal based on delivered costs to southern China. Given Qinhuangdao's proximity to Japan and Korea, Chinese exports could threaten to displace higher-cost Australian exports, although Australian coal's superior quality may be its saving grace.<sup>68</sup>*

Many other financial analysts are saying that the Chinese coal boom is over:

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<http://www.mudgeeguardian.com.au/story/1571191/mayor-slams-funding-plan-for-ulan-road/?cs=1485>.

<sup>65</sup> (ABS, 2013) See also ABS Cat 5368.0.55.003 International Trade in Services by Country, by State and by Detailed Services Category, Financial Year, 2012-13

<sup>66</sup> (Edwards, 2011)

<sup>67</sup> (BREE, 2013)

<sup>68</sup> (MorningStar, 2014) p71

*In China, decelerating power demand growth, combined with more gas-fired, nuclear, hydro, renewables and nuclear generation, and decelerating or falling demand in other coal end markets (steel, cement, fertilizer, industrial usage), give rise to an outcome that is mathematically obvious but still difficult to say or write: 2015 is going to be the peak year for Chinese coal consumption **ever**.<sup>69</sup>*

*Chinese demand growth is slowing as economic growth slows (each cyclical peak is likely to be below the last), China transitions away from investment and manufacturing led growth, alternative power capacity is built out, and environmental measures are enacted to discourage coal usage.<sup>70</sup>*

There is debate around the future of the Chinese and Pacific coal markets. While there are a range of opinions, the Department's focus on tenfold growth over recent years is far removed from that of the mainstream views of the financial community.

## Domestic market and electricity generation

The Watermark project will almost certainly be focussed on Chinese markets as discussed above, so the domestic market is largely irrelevant to this project. The EAR considers it, however:

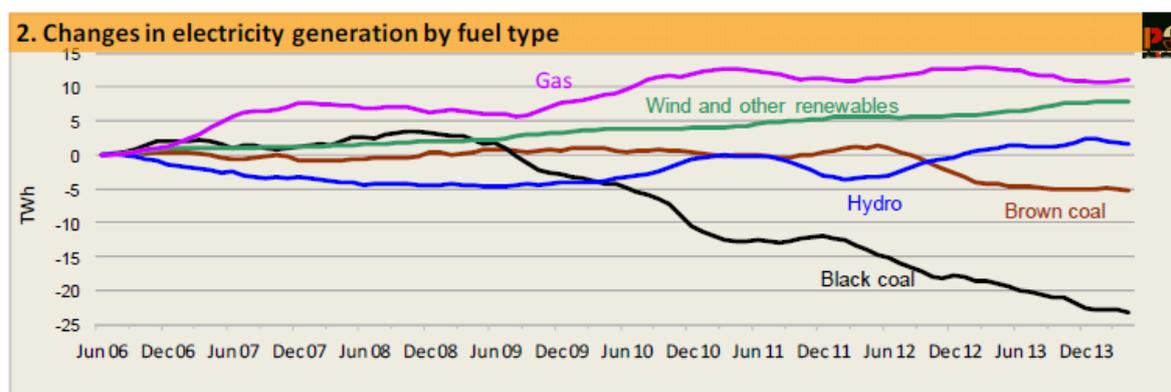
*The main domestic users of coal produced in NSW include 8 power stations near Singleton (Bayswater, Liddell and Redbank), Lithgow (Mt Piper and Wallerawang) and on the Central Coast (Eraring, Vales Point and Munmorah); and the 2 steelworks at Port Kembla and Whyalla in South Australia. (p21)*

...

*Domestically, coal supplies 90% of the State's electricity and also provides essential support to the steelworks at Port Kembla and the aluminium smelters in the Hunter. (p23)*

While no reference is given for these figures, they are likely to be overstated. NSW black coal-fired generators have been the biggest losers in the National Electricity Market in recent years, losing out to gas and renewable generators as shown in Figure 7 below:

**Figure 7: Electricity generation by fuel type**



Source: (Pitt & Sherry, 2014) see also (Saddler, 2013)

<sup>69</sup> (Bernstein Research, 2013) p5, emphasis in original

<sup>70</sup> (Citi, 2014) p4

**In our view, the role that coal plays in the local and state economies is inaccurately depicted in the EAR:**

*[The] coal industry is rapidly developing in the region and a key driver for the local economy, with global coal demand reliably forecast to continue to increase significantly. (p28)*

This is not a credible statement - coal is not a major part of NSW economic output and is a minor employer both for the state and the Liverpool Plains LGA. The coal industry's contributions to state government revenues is modest – around 2 per cent. While a significant part of merchandise exports, most export revenues are expatriated due to high levels of foreign ownership.

The future of the coal industry internationally and domestically is uncertain as Chinese domestic production changes and competition from other energy sources intensifies. While coal demand will continue for years to come, most analysts see demand peaking in the near future. One issue that will influence this demand is climate change and government policies relating to it.

## Climate Change

The EAR plays down the role of coal supply in climate change issues:

*It must be noted that if the project was not allowed to proceed, the resultant gap in the coal supply would be almost certainly filled by another coal resource either in NSW, Australia or overseas. (p78)*

While much of the coal that would be supplied by Watermark could be supplied from other mines, it is incorrect to argue that the entire amount would be replaced. In economic terms, this is arguing that coal supply is “perfectly elastic” – that supply is immediately and always replaced to the same level.

Having argued that the project will make no difference to coal markets, the Department then finds itself in the difficult situation of having to argue simultaneously that the project is important to fulfil energy needs:

*The Department is satisfied that there is a clear need for the development of new coal deposits, for at least the foreseeable future, to meet society's basic energy needs. (p78)*

The Department's view is quite the opposite of investment banks like Goldman Sachs:

*We argue that existing capacity will be sufficient to satisfy demand for the rest of the decade without the need for new investment in large greenfield [coal] projects.<sup>71</sup>*

It is important to understand that by recommending approval of new coal projects, we create long-lived entities and projects with a clear incentive to lobby for ever greater coal use. This is fundamentally incompatible with efforts to combat climate change. The Department's claim that the NSW planning process should not be concerned with climate change should be reconsidered.

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<sup>71</sup> (Goldman Sachs, 2014)p15

## Conclusion

**The Watermark project EIS employs flawed modelling, ignores impacts on agriculture and bases its cost benefit analysis on unrealistic coal price and cost assumptions.** The EIS economic assessment and Agricultural Impact Assessment have been heavily criticised in submissions and the RTS inadequately addresses the issues raised.

Debate over the economic merits of coal projects in NSW has been escalating in recent times. At the time of writing, the new Planning Minister had just announced major reforms to the way economic assessment will be commissioned in the planning process.<sup>72</sup> The Minister's action has apparently been spurred by the Wallarah 2 coal project, but a string of other projects are likely to have prompted this review:

- **Warkworth extension project** – Initial claim of a \$1.9 billion net benefit was rejected by the NSW Land and Environment Court and the NSW Supreme Court. The Land and Environment Court judgment found that contrary to the proponent's analysis, the costs of the project outweighed its benefits.<sup>73</sup>
- **Coalpac consolidation project** – Initial claim of \$1.5 billion net benefit was dismissed by the PAC as being “grossly overstated”.<sup>74</sup> The project was ultimately rejected by the Department.
- **Drayton South proposal** – Initial estimate of \$887 million net benefit fails to include project impacts on other industries, an important basis for PAC recommendation against approval.<sup>75</sup>
- **Ashton South East Open Cut proposal** – Initial cost benefit analysis with estimate of net benefit \$368 million was rejected by the project proponents as being unsound for scrutiny by the Land and Environment Court.<sup>76</sup>
- **Stratford extension project** – Cost benefit calculations dismissed by PAC as “unrealistic”.<sup>77</sup>

These cases and the Watermark project share a common point – their economic assessments were all prepared by the same consultancy, Gillespie Economics. Like the Watermark EIS, several of these assessments were reviewed by Dr Jeff Bennett. While Dr Bennett is a well known academic, we question his suitability to provide peer review of Gillespie Economics work as he is the PhD supervisor of Gillespie Economics principal, Rob Gillespie.<sup>78</sup> Dr Bennett and Mr Gillespie have jointly consulted to the coal industry<sup>79</sup> and have jointly written academic papers.<sup>80</sup>

Despite the mounting controversy over economic assessment of coal projects, the Department's EAR includes little discussion of economics and seems to ignore submissions on the cost benefit analysis:

<sup>72</sup> (McKenny & Whitbourn, 2014)

<sup>73</sup> (Gillespie Economics, 2009b; Preston, 2013)

<sup>74</sup> (Gillespie Economics, 2011)(PAC, 2012)p139

<sup>75</sup> (Gillespie Economics, 2012a; PAC, 2013)

<sup>76</sup> (Gillespie Economics, 2009a): judgment pending at time of writing. See court transcripts for extensive discussion of cost benefit analysis.

<sup>77</sup> (Gillespie Economics, 2012b; PAC NSW, 2014a)

<sup>78</sup> <https://crawford.anu.edu.au/people/academic/jeff-bennett>

<sup>79</sup> (Bennett & Gillespie, 2012)

<sup>80</sup> For example (Gillespie & Bennett, 2012)

*The Department acknowledges that Benefit Cost Analyses are also commonly criticised, with reasonable people differing on the value that should be placed on various costs and benefits, particularly the externalities.<sup>81</sup>*

However, we have seen that expert economic criticism of the Watermark project focuses not on externalities, but on key issues such as the suitability of input output multipliers for project evaluation, the financial costs and benefits of the project and the impacts of the project on agriculture. These issues are at the core of the Director General's Requirements for the Planning Assessment Commission's review of the project – to establish whether the project results in a net benefit to the NSW community.

This requirement is not assisted by the Watermark economic assessment's use of input output modelling, which are mathematically certain to overstate the positive aspects of the project. This modelling has been dismissed as unreliable by a long list of institutions including the PAC, NSW Treasury, the Australian Bureau of Statistics and the Productivity Commission.

The risks to the irrigation industry have not been considered in the analysis, especially as it is based on 2006 data. These risks are ignored entirely in the EIS economic assessment despite basic estimates showing that around \$1 billion of irrigation assets are at risk of becoming stranded assets, with tens of millions in annual agricultural income and inputs into the local economy also likely to be impacted by the project. These impacts mean the project represents a net economic loss to NSW. Importantly these impacts fall entirely on local stakeholders in the Liverpool Plains region.

The financial case for the project has been heavily overstated. It is a point of agreement between submissions to the EIS and the RTS that coal prices in the EIS are well above current prices and analysts' forecasts. The operating costs of the mine predicted are far below the average in Australian mines, while no allowance for average capital cost overruns is considered. It is clear, therefore, that the mine will not produce the benefits forecast in the EIS and that attention needs to be paid to the project's financial strength and the distribution of any net benefits that may accrue.

Taking consideration of these issues, our central estimate of the project's net present value is \$266 million. However, the project will be unable to pay required royalties, meaning its viability must be questioned. The project would be unlikely to proceed under its current plans, giving the proponents strong incentive to lobby for modifications and looser environmental conditions which would place greater risk on the community.

Being financially marginal and posing substantial risks to agriculture, the Watermark project will not deliver a net benefit to the NSW Community. **The PAC can have no confidence in the analysis provided in the Watermark EIS and accordingly should recommend rejection of the project.**

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<sup>81</sup> p113

## References

- Abelson, P. (2011). Evaluating Major Events and Avoiding the Mercantilist Fallacy. *Economic Papers: Journal of the Economic Society of Australia*, 30(1), 48–59. doi:10.1111/j.1759-3441.2011.00096.x
- ABS. (2011). Australian National Accounts: Input-Output Tables - Electronic Publication, Final release 2006-07 tables. Australian Bureau of Statistics. Retrieved from [http://www.abs.gov.au/AUSSTATS/abs@.nsf/Previousproducts/5209.0.55.001MainFeatures4Final release 2006-07 tables?opendocument&tabname=Summary&prodno=5209.0.55.001&issue=Final release 2006-07 tables&num=&view=](http://www.abs.gov.au/AUSSTATS/abs@.nsf/Previousproducts/5209.0.55.001MainFeatures4Final%20release%202006-07tables?opendocument&tabname=Summary&prodno=5209.0.55.001&issue=Final%20release%202006-07tables&num=&view=)
- ABS. (2013). *2012-13 State accounts* (pp. 1–92). Australian Bureau of Statistics, Cat 5220.0. Retrieved from [http://www.ausstats.abs.gov.au/Ausstats/subscriber.nsf/0/154DF709B44199D0CA257C3000115973/\\$File/52200\\_2012-13.pdf](http://www.ausstats.abs.gov.au/Ausstats/subscriber.nsf/0/154DF709B44199D0CA257C3000115973/$File/52200_2012-13.pdf)
- Barnett, S. (2013). *Watermark Coal Project - Agricultural Impact Statement*. Prepared by Scott Barnett and Associates for Shenhua Watermark Coal. Retrieved from [https://majorprojects.affinitylive.com/public/3f5cb0f62fc3cca73966abd10261b928/29.Watermark Coal Project EIS - Appendix Z - Agricultural Impact Statement.pdf](https://majorprojects.affinitylive.com/public/3f5cb0f62fc3cca73966abd10261b928/29.Watermark%20Coal%20Project%20EIS%20-%20Appendix%20Z%20-%20Agricultural%20Impact%20Statement.pdf)
- Bennett, J., & Gillespie, R. (2012). Affidavit of Professor Jeffrey William Bennet relating to the Proposed Warkworth Coal Mine extension.
- Bernstein Research. (2013). *Asian Coal & Power: Less, Less, Less...The Beginning of the End of Coal*.
- BREE. (2013). *Resources and Energy Statistics 2013*. Bureau of Resources and Energy Economics, Canberra.
- BREE. (2014). *Resources and Energy Quarterly March Quarter 2014*. Retrieved from <http://www.bree.gov.au/sites/default/files/files//publications/req/REQ-2014-03.pdf>
- Campbell, R. (2014). *Seeing through the dust: Coal in the Hunter Valley economy*. The Australia Institute, Policy Brief No. 62. Retrieved from <http://www.tai.org.au/content/seeing-through-dust-coal-hunter-valley-economy>
- CARE. (2003). *The Impact of the Namoi GroundWater Sharing Plan: a socio-economic analysis of the impact of the reduction in groundwater allocations in the Namoi Valley*. Report to the Department of Transport and Regional Services, prepared by Centre for Agricultural and Regional Economics Pty Ltd, Armidale, NSW.
- Citi. (2014). *Global Thermal Coal: When cyclical supply met structural demand*. Citi Research -Multi Asset. Retrieved from <https://ir.citi.com/MHQVVh0UlyfvtOGK1XlzCyxIAI2a2dMWNcmAqQaWyGCMEhCHhwKfWA%3D%3D>
- Denniss, R. (2012). *The use and abuse of economic modelling in Australia: Users' guide to tricks of the trade*. The Australia Insitute.

- Economists at Large. (2013). *Review of Watermark Coal Project Environmental Impact Statement Economic Impact Assessment*. A report for the Caroona Coal Action Group prepared by Economists at Large, Melbourne, Australia.
- Edwards, N. (2011). *Foreign ownership of Australian mining profits: Now are we selling the farm?* (pp. 1–20). Briefing paper prepared for the Australian Greens.
- Foley, M. (2013). Shenhua defies downturn to progress Watermark project. *Australian Journal of Mining*, (June 2013), 6–7.
- Galilee, S. (2012). Mining supporting our coal communities. *Australian Mining*. Retrieved February 04, 2014, from <http://www.miningaustralia.com.au/features/mining-supporting-our-coal-communities>
- Gillespie Economics. (2009a). *Ashton Coal Project Extension Benefit Cost analysis*. Analysis of the South East Open Cut Project and Ashton Coal Project Modification, Appendix 18 of Environmental Assessment.
- Gillespie Economics. (2009b). *Warkworth coal project EIS: Annex O Economic Study*. Prepared for Warkworth Mining Limited.
- Gillespie Economics. (2011). *Coalpac Consolidation Project Economic Assessment*. Prepared for Coalpac Pty Ltd.
- Gillespie Economics. (2012a). *Drayton South Coal Project - Economic Impact Assessment*.
- Gillespie Economics. (2012b). *Stratford Extension Project Environmental Impact Statement Appendix P Socio-economic assessment*. Prepared for Yancoal Australia.
- Gillespie Economics. (2013). *Watermark Coal Project Environmental Impact Statement - Appendix AF Economic Impact Assessment*. Prepared for Shenhua Watermark Coal Pty Ltd.
- Gillespie, R., & Bennett, J. (2012). Valuing the environmental, cultural and social impacts of open-cut coal mining in the Hunter Valley of New South Wales, Australia. *Journal of Environmental Economics and Policy*, 1(3), 276–288. doi:10.1080/21606544.2012.714970
- Goldman Sachs. (2014). *The thermal coal paradox*. Heat Sensor - Commodities Research, May 2014.
- Gretton, P. (2013). *On input-output tables: uses and abuses*. Staff Research Note, Productivity Commission, Canberra. Retrieved from [http://www.pc.gov.au/\\_\\_data/assets/pdf\\_file/0008/128294/input-output-tables.pdf](http://www.pc.gov.au/__data/assets/pdf_file/0008/128294/input-output-tables.pdf)
- Grudnoff, M. (2012). *Pouring Fuel on the Fire: The nature and extent of Federal Government subsidies to the mining industry*. Policy brief by The Australia Institute.
- Grudnoff, M. (2013). *Pouring more fuel on the fire: the nature and extent of federal government subsidies to the mining industry*. Policy brief number 52. The Australia Institute, Canberra. Retrieved from <http://www.tai.org.au/content/pouring-more-fuel-fire>
- Hansen Bailey. (2013). *Watermark Coal Project: Response to submissions* (pp. 575–611). Produced for Shenhua Coal.

- Koth, B. (2013). The breakdown of the Australian junior mining markets – Reasons, Implications and Alternatives. *Mining Australia*. Retrieved June 16, 2014, from <http://www.miningaustralia.com.au/features/the-breakdown-of-the-australian-junior-mining-mark>
- Lawrence Consulting. (2013). *NSW Mining Industry Economic Impact Assessment 2012/13*. Prepared for NSW Minerals Council. Retrieved from <http://www.nswmining.com.au/industry/economic-report>
- Layman, B. (2002). The Use and Abuse of Input-Output Multipliers. *Economic Research Articles of the Department of Treasury and Finance, Western Australia*, (March). Retrieved from <http://www.treasury.wa.gov.au/cms/uploadedFiles/ecoresearchart2002.pdf>
- Lucarelli, B. (2011). *Australia's Black Coal Industry: Past Achievements and Future Challenges*. Working Paper #101, Stanford Program on Energy and Sustainable Development. Retrieved from [http://iis-db.stanford.edu/pubs/23156/WP\\_101\\_\\_Lucarelli\\_Australia%27s\\_\\_Black\\_\\_Coal\\_Industry.pdf](http://iis-db.stanford.edu/pubs/23156/WP_101__Lucarelli_Australia%27s__Black__Coal_Industry.pdf)
- Markle, K. S., & Shackelford, D. (2009). *Do multinationals or domestic firms face higher effective tax rates?* Working Paper 15091, National Bureau of Economic Research, Cambridge, MA. Retrieved from <http://www.nber.org/papers/w15091>
- McKenny, L., & Whitbourn, M. (2014, June 16). Mining assessments to be beefed up after scathing review. *Canberra Times*. Canberra, originally published in Sydney Morning Herald. Retrieved from <http://www.canberratimes.com.au/nsw/mining-assessments-to-be-beefed-up-after-scathing-review-20140616-zs9sd.html>
- Morgan Stanley. (2013). *Australia Mining Cost Survey*. Morgan Stanley Research Australia.
- MorningStar. (2014). *Burned out: China's Rebalancing Heralds the End of Coal's Growth Story*. MorningStar Basic Materials Observer.
- NSW DPI. (2012). *Strategic Regional Land Use Plan: New England North West*. NSW Department of Planning and Infrastructure.
- NSW Government. (2013). *NSW Budget Statement: Chapter 6 : General Government Revenues* (pp. 1–27). Retrieved from [http://www.budget.nsw.gov.au/budget\\_papers/budget\\_paper\\_2](http://www.budget.nsw.gov.au/budget_papers/budget_paper_2)
- NSW Minerals Council. (2011). Submission to the NSW budget 2011-12. *Australian Mining*.
- NSW Supreme Court. (2014). *Warkworth case appeal judgement*.
- NSW Treasury. (2007). *NSW Government Guidelines for Economic Appraisal*. Office of Financial Management: Policy & Guidelines Paper.
- NSW Treasury. (2009). Employment Support Estimates - Methodological Framework. *Secretary*. Office of Financial Management: Research and Information Paper.
- NSW Valuer General. (2014). *Study on the impact of the Coal Seam Gas industry on land values in NSW*. Department of Land and Property Information. Retrieved from

[http://www.valuergeneral.nsw.gov.au/about\\_us/announcements/?a=197003#Study on the impact of the coal seam gas industry](http://www.valuergeneral.nsw.gov.au/about_us/announcements/?a=197003#Study on the impact of the coal seam gas industry)

- PAC. (2012). *Commission Coalpac Consolidation Project Review: Main Report*. NSW Planning and Assessment Commission.
- PAC. (2013). *Drayton South Coal Project Review Report*. NSW Planning and Assessment Commission, December 2013.
- PAC NSW. (2014a). *Stratford Extension Project Review Report*. Planning and Assessment Commission NSW.
- PAC NSW. (2014b). *Wallarah 2 Coal Project Review Report*. NSW Planning and Assessment Commission. Retrieved from <http://www.pac.nsw.gov.au/Projects/tabid/77/ctl/viewreview/mid/462/pac/371/view/readonly/myctl/rev/Default.aspx>
- Peel, M., Campbell, R., & Denniss, R. (2014). *Mining the Age of Entitlement: State government assistance to the minerals and fossil fuel sector*. The Australia Institute, Technical Brief No. 31. Retrieved from [www.tai.org.au](http://www.tai.org.au)
- Pitt & Sherry. (2014). *CEDEX: Carbon emissions index*. Quarterly Electricity Emissions Update - to 30 April 2014. Retrieved from [http://www.pittsh.com.au/assets/files/Cedex/CEDEX Electricity Update May 2014\(1\).pdf](http://www.pittsh.com.au/assets/files/Cedex/CEDEX Electricity Update May 2014(1).pdf)
- Preston, B. (2013). *Judgement on Bulga Milbrodale Progress Association Inc v Minister for Planning and Infrastructure and Warkworth Mining Limited*. Judgement in the Land and Environment Court, New South Wales. Retrieved from [http://www.edo.org.au/edonsw/site/pdf/casesum/Warkworth\\_judgment.pdf](http://www.edo.org.au/edonsw/site/pdf/casesum/Warkworth_judgment.pdf)
- Richardson, D., & Denniss, R. (2011). *Mining the truth: the rhetoric and reality of the mining boom*. Institute paper number 7, The Australia Institute, Canberra.
- Saddler, H. (2013). *Power Down: Why is electricity consumption decreasing?* The Australia Institute, Canberra, Australia. Retrieved from <http://www.tai.org.au/content/power-down>
- Smith, P. A. (2014). *Judgement: Hancock Coal Pty Ltd v Kelly & Ors and Department of Environment and Heritage Protection*. Judgement in the Queensland Land Court. Retrieved from <http://www.landcourt.qld.gov.au/documents/decisions/MRA082-13-etc-4-12.pdf>
- Spackman, P. (2000). *Value of groundwater licences*. Produced for the Namoi Groundwater Taskforce.
- Whitehaven Coal. (2014). *Whitehaven Coal March 2014 Quarterly Production Report* (pp. 1–10). Retrieved from <http://www.whitehavencoal.com.au/investors/docs/march-quarterly-report-2014.pdf>
- World Bank. (2014). *Commodity markets outlook*. Commodity Market Outlook. Retrieved from [http://www.worldbank.org/content/dam/Worldbank/GEP/GEP2014a/Commodity\\_Markets\\_Outlook\\_2014\\_January.pdf](http://www.worldbank.org/content/dam/Worldbank/GEP/GEP2014a/Commodity_Markets_Outlook_2014_January.pdf)

Yancoal. (2014). *Quarterly report for quarter ending December 2013. Emergency medicine journal : EMJ* (Vol. 29, p. 348). doi:10.1136/emmermed-2012-201134