

# Last roll of the dice

## Submission on the Winchester South EIS economic assessment

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*Winchester South is a marginal project. It would produce low value coal, in contradiction with Whitehaven's stated objective of producing premium coal. The economic assessment, astonishingly, does not consider the impact of climate action on the coal market. Optimism bias and management incentives explain why mining approval is being sought despite the weak financial or economic case for the project.*

Tony Shields  
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# Summary

The history of Winchester South indicates the project is financially marginal. Winchester South was owned by Rio Tinto prior to Whitehaven Coal purchasing it in 2018. Rio Tinto owned the project for over thirty years, drilled around 1,250 holes over the site to assess it and yet decided not to develop it despite Rio Tinto's very substantial financial resources.

Astonishingly for an analysis of a coal mine written in 2021, Deloitte provide no discussion of what impact climate change and the world moving away from fossil fuels will have on the demand for, and price of, coal and the viability of the project. Deloitte assume that prices for the lower thermal coal and low-grade metallurgical coal that this mine produce will remain steady over the next 30 years, with even a modest boost of prices in the 2050s. This is despite almost all countries likely to buy coal from this project having committed to net zero emissions by that time. Winchester South's lower grade coal is likely to be affected more by this demand and price decline than if it produced high grade coal. Whitehaven itself recognises this and has stated it wants to concentrate on higher grade coal. Despite this, Whitehaven is pursuing approval.

Despite the potential for massive disruption to the coal market, the EIS economic assessment contains no analysis of the likely breakeven point for the mine. Given this mine is marginal, it is likely that the mine will close before its expected 30 year life (ie before the claimed benefits would occur). Whitehaven's poor environmental record, total reliance on coal for its revenue and significant debt load indicate the Queensland Government could be left rehabilitating the mine site.

Winchester South's forecast Scope 3 emissions are omitted and the risks to groundwater understated.

There is an extensive economic literature on how economic assessments of major projects (including mine projects) overstate the net benefits of projects, often by many orders of magnitude. Over-optimism and management incentives explain why approval is being sought for this project. Gaming the mining approvals process should be discouraged, not rewarded.

# Introduction

The Australia Institute welcomes the opportunity to make a submission on the Winchester South project. This submission focuses on the economic assessment of the project, prepared by consultants Deloitte Access Economics (Deloitte), Appendix K of the Environmental Impact Statement (EIS).<sup>1</sup>

The history of Winchester South indicates the project is financially marginal. Winchester South was owned by Rio Tinto prior to Whitehaven Coal purchasing it in 2018. Rio Tinto owned the project for over thirty years, drilled around 1250 holes over the site to assess it and yet decided not to develop it despite Rio Tinto's very substantial financial resources.<sup>2</sup>

In this context, Deloitte's estimate that the project will generate a net benefit of \$756 million to Queensland appears dubious at best. Deloitte's analysis is partly based on estimates provided by Whitehaven and assumptions that are not realistic. Deloitte's analysis overstates the case for the project and understates its costs.

The Winchester South EIS should also be read in the context of the overall Australian thermal coal industry. Major companies are selling out, or as in the case of BHP's Mt Arthur mine, struggling to sell out. Mt Arthur is a larger mine than Winchester South is planned to be. BHP valued Mt Arthur at \$2 billion less than a year ago and yet now values it a negative \$275 million reflecting its rehabilitation commitments.<sup>3</sup> BHP is selling out of its thermal coal mines as well as some metallurgical mines.<sup>4</sup> Whitehaven itself wrote \$640 million off its asset base in financial year 2021 (a 17% reduction).<sup>5</sup>

In this context it is highly unlikely that a new coal mine can deliver a net economic benefit to Queensland.

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<sup>1</sup> Deloitte Access Economics (2021) *Appendix K: Economic Assessment*, <https://eisdocs.dsdip.qld.gov.au/Winchester%20South/Draft%20EIS/appendix-k-economic-assessment.pdf>

<sup>2</sup> Whitehaven Coal (2018) *Coal Resources for Winchester South Project*, <https://www.asx.com.au/asx/v2/statistics/announcements.do>

<sup>3</sup> Hannam (2021) 'Negative value': BHP struggles to offload NSW's biggest coal pit <https://www.smh.com.au/environment/climate-change/negative-value-bhp-struggles-to-offload-nsw-s-biggest-coal-pit-20210818-p58ju2.html>

<sup>4</sup> Financial Review (2021) *Reshaped BHP comes home to lower carbon future*, <https://www.afr.com/policy/energy-and-climate/reshaped-bhp-comes-home-to-lower-carbon-future-20210818-p58jo5>

<sup>5</sup> Whitehaven Coal (2021) *Annual Financial Report 2021*, p67, <https://whitehavencoal.com.au/fy21-results/>

# Key flaws in Deloitte analysis

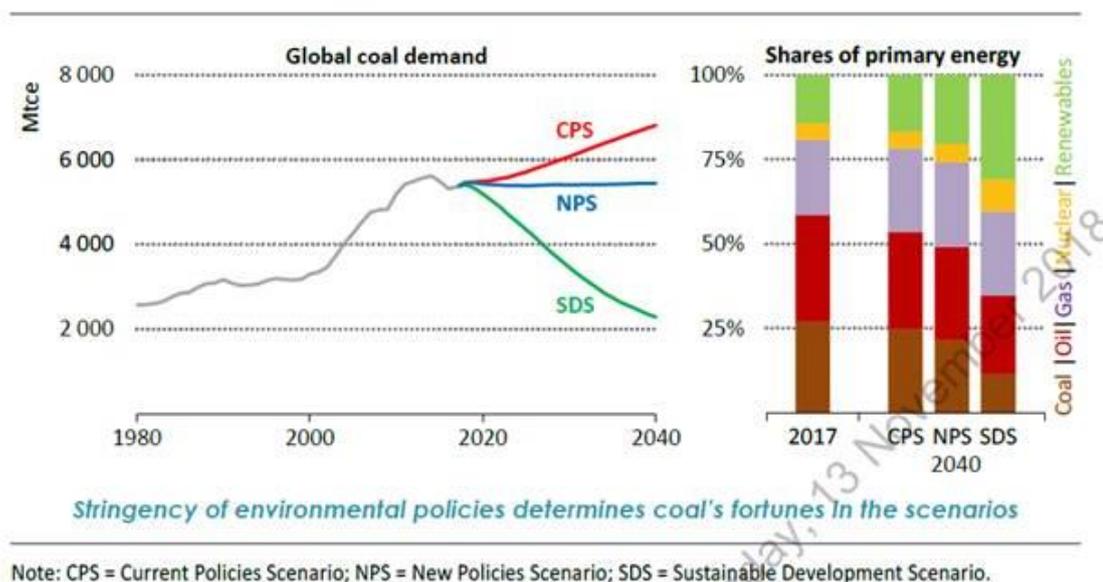
## CLIMATE POLICY AND COAL MARKETS

Astonishingly for an analysis of a coal mine written in 2021, Deloitte provide no discussion of what impact climate change and the world moving away from fossil fuels will have on the demand for and price of coal, and the viability of the project.

Deloitte assume that prices for thermal coal and low-grade metallurgical coal remain steady over the next 30 years, with even a modest boost of prices in the 2050s. This despite almost all countries likely to buy coal from this project having committed to net zero emissions by that time.

The thermal coal market is expected to decline dramatically if climate policies are implemented in line with the Paris Agreement. Figure 1 below shows the International Energy Agency (IEA)'s estimates for global coal demand under its three modelled scenarios. The green line labelled "SDS" represents the sustainable development scenario' in line with the Paris Agreement.

**Figure 1: IEA coal demand estimates**



Source: IEA (2018) *World Energy Outlook 2018*, [www.iea.org](http://www.iea.org)

Figure 1 shows that under the SDS scenario coal demand declines significantly in the years ahead, reducing by two thirds by 2040. This would have a major effect on the Project's volume of coal sold and the price received as the IEA expects the volume of

traded coal to decline from over 1,100 million tonnes per annum (Mtpa) in 2017 to 815Mtpa in 2025 and 518Mtpa in 2040.<sup>6</sup>

We note that in its decision regarding the Bylong Coal Project, the NSW Independent Planning Commission “considers that the SDS represents a market scenario which should have been considered” and that “the Commission considers that the Applicant should have tested the SDS”.<sup>7</sup> BIS Oxford Economics in its review of the NSW Tahmoor project economic assessment, wrote:

**Figure 2: Extract from BIS Oxford Economics review of Tahmoor coal project on future coal markets**

As indicated, and although not mentioned in the Guidelines, an additional risk is obviously the question of global demand for coal (and justification for the export of Australian coal) given increasing concerns about global warming impacts. These concerns have been rising in recent years and may well sharpen during the lifetime of the project (2020-2035). Obviously this would affect the financial viability of the TSCP itself, however to the extent that this would also impact on NSW this is also a relevant issue. In short, there is arguably a risk that costs of mine development impact the State but the full benefits (e.g. taxation benefits) are never realised. This may be an issue the Department could further examine.

Source: BIS Oxford Economics (2020) page 15

The demand for coking coal is also likely to suffer from the move away from fossil fuels though perhaps not as quickly as demand for thermal coal. An internet search for green steel finds many articles on how hydrogen-based steel production will reduce demand for coking coal. Some recent headlines include

- Grattan Institute: Green steel is no longer a fantasy.<sup>8</sup>
- Green steel is hailed as the next big thing in Australia.<sup>9</sup>
- Swedish company ships first batch made without using coal.<sup>10</sup>

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<sup>6</sup> IEA (2018) *World Energy Outlook 2018*, table 5.1, [www.iea.org](http://www.iea.org).

<sup>7</sup> Independent Planning Commission (2019) *Statement of reasons for decision: Bylong Coal Project*, p139. [bylong-coal-project-ssd-6367--statement-of-reasons-for-decision.pdf \(nsw.gov.au\)](https://www.ipc.nsw.gov.au/bylong-coal-project-ssd-6367--statement-of-reasons-for-decision.pdf)

<sup>8</sup> Grattan Institute (2020) *Green steel is no longer a fantasy* <https://grattan.edu.au/news/green-steel-is-no-longer-a-fantasy/>

<sup>9</sup> Allen and Honeyands (2021) ‘Green steel’ is hailed as the next big thing in Australian industry. <https://theconversation.com/green-steel-is-hailed-as-the-next-big-thing-in-australian-industry-heres-what-the-hype-is-all-about-160282>

<sup>10</sup> Reuters (2021) Swedish company ships first batch made without using coal <https://www.theguardian.com/science/2021/aug/19/green-steel-swedish-company-ships-first-batch-made-without-using-coal>

- Green steel: the race to clean up one of the world’s dirtiest industries.<sup>11</sup>

AnalytEcon in its economic analysis of the NSW Mt Pleasant coal mine, note that the approach taken in economic assessment of coal mines in NSW, and by Deloitte in the Winchester South EIS, is “not well suited” to consider the impacts on a project valuation of a change such as a major shift in coal demand:

It should be noted, however, that the CBA model framework is not well suited to capture the impacts of material external shocks. .... In contrast, the CBA model takes the production profile, as well as operating, capital, and labour costs as fixed, so that royalty payments to the NSW Government would continue to be made while the producer surplus would turn negative.<sup>12</sup>

Deloitte does not follow AnalytEcon’s approach. Deloitte have sufficient data to estimate what cost and revenue changes would be required for returns to the proponents to reach levels that would see production cut back or halted. It is their choice, or perhaps their client’s instructions that has prevented this information being made available to decision makers.<sup>13</sup>

## PRODUCTION AND QUALITY

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It is difficult to assess Deloitte’s analysis in detail because there is no production schedule detailing what type of coal is to be produced and the cost of production in which year. This is unusual as many similar mining project analysis contains a production schedule, including analyses conducted by Deloitte.

This is also important as nearly half of the planned production is thermal coal (though this information is not contained in Deloitte’s analysis, it is only mentioned elsewhere in the EIS.)<sup>14</sup> This is important and potentially misleading as the demand (and price) for thermal coal is likely to decline into the future as the world shifts away from the coal-fired power.

Just as there is no idea of the volume of thermal coal to be produced, there is also no discussion of the *grade* of that thermal coal. Deloitte has used the price forecasts for

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<sup>11</sup> Pooler (2021) ‘Green steel’: the race to clean up one of the world’s dirtiest industries, <https://www.ft.com/content/46d4727c-761d-43ee-8084-ee46edba491a>

<sup>12</sup> AnalytEcon (2021) *Appendix O: Economic Assessment*, p55

<sup>13</sup> See below in *Misleading Sensitivity Analysis*

<sup>14</sup> Whitehaven Coal (2021) *Winchester South Project, EIS*, p2-55, <https://www.statedevelopment.qld.gov.au/coordinator-general/assessments-and-approvals/coordinated-projects/current-projects/winchester-south-project/winchester-south-project-draft-eis-documents>

high ash thermal coal as the assumed price for coal into the future and this is price is forecast to remain virtually unchanged over thirty-year life of the mine. However high ash thermal coal is low quality coal. It is an unrealistic assumption that such volumes of low quality coal will be saleable for decades at roughly today's coal prices.

Similar to thermal coal, there is no discussion of the grade of metallurgical coal to be produced. Deloitte has used the price forecasts for PCI and semi-hard coking coal. These are lower grades than the premium hard coking coal produced by much of the industry in Queensland. Demand for this lower grade coal is also expected to decline faster than for the premium grade.

Whitehaven itself recognises that demand for lower grade coal will fall sharply. In August 2021 the CEO of Whitehaven said:<sup>15</sup>

“As regulation focuses more on the emissions-reduction capability of higher quality coal, I think producers like us will tend to want to gravitate more to that section of your mining deposit that delivers the best outcome in that regard,” he said.

“We have focused on minimising our exposure to lower rank coals.”

In this context, it is unclear whether Whitehaven is serious about developing the Winchester South project, with its lower grade coal.

## MISLEADING SENSITIVITY ANALYSIS

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Deloitte claims to provide sensitivity analysis of Winchester South's net benefit to the Queensland community. It estimates that a 25% drop in the export coal price would reduce the net benefit only marginally from \$756 million to \$705 million.<sup>16</sup>

This is a surprising result to say the least. The suggestion that a marginal mine, undeveloped by a major company for 30 years, now being developed by a second tier miner, could weather a 25% reduction in coal price with just a 7% reduction in net benefits should raise concerns about the quality of this analysis.

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<sup>15</sup> Ker (2021) *Coal boom takes Whitehaven from zero to hero*, <https://www.afr.com/companies/mining/coal-boom-takes-whitehaven-from-zero-to-hero-20210826-p58m6v>

<sup>16</sup> Deloitte (2021) p. vi

The deception in Deloitte’s analysis is that it ignores at what coal price the project is viable or breaks-even. The 25% drop in the coal price could make the mine uneconomic, but under Deloitte’s assumptions, it continues operating, paying royalties and taxes.

It is impossible ascertain where the breakeven point for the mine is, since the analysis lacks a production schedule and other information needed. A very rough idea can be gained by using the information given to estimate what percentage fall in gross revenue (12%) or rise in cost of production (16%) makes the net producer surplus of the mine negative (Table 1 below).

A combined 12-16 % decrease in gross revenue or increase in total costs from those projected is very likely (ie revenue is 10% lower than projected, total costs are 8% higher), as explained in Table 1 below:

**Table 1: Changes in revenue and operating costs required to breakeven (NPV terms)**

Item		\$m	Comment
A	Net producer surplus	685	This is the producer surplus received after paying company tax
B	Projected net producer surplus before tax	979	A*100%/70% (Grossing net producer surplus to a before tax number using a company tax rate of 30%)
C	Gross Revenue	8028	
	Fall in gross revenue that will make net producer surplus before tax zero (ie breakeven)	12%	B as a percentage of C
D	Total costs	6071	
	Rise in total costs that will make net producer surplus before tax zero (ie breakeven)	16%	B as a percentage of D

Source: Deloitte Access Economics (2021) *Appendix K: Economic Assessment* for items A, C and D.

Table 1 is only a rough guide because it ignores the difference between operating and capital costs and that royalties vary with revenue and the time of money. However, an even a bigger combined change is still quite likely as discussed below in ‘*Project assessment literature and over-estimation of net benefits*’. Notably there are three significant variables that are likely to fall short of forecast - price, cost and production volume. The point is that the project is marginal and is unlikely to deliver the estimated economic benefits. If approved, the project is likely to experience delay in development and if developed there is a significant chance that it could spend periods in care and maintenance, be closed early or abandoned. This uncertainty imposes costs on other land holders and industries, meaning the proposal could impose a net cost on the Queensland community.

## WHY DEVELOP A MARGINAL PROJECT

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It is sensible to ask, ‘Why would a mining company develop a marginal project?’ In Whitehaven’s case it is also sensible to ask why develop a mine with lower grade coal having stated (see earlier) it wants to concentrate on high grade coal.

Notably this application is not about giving the go-ahead to develop Winchester South to develop, it is about gaining an option to develop Winchester South in the future. Planning approval could add tens of millions to the value of the project which can then be on-sold, while the costs of an EIS and lodging a planning application may not even reach single digit millions. Few investments have the potential to make such tenfold returns. Other reasons discussed further below include the natural optimism of company executives and the principal agent problem. The remuneration of mining company executives depends on the size of their company, many of the executives will have left the company when, in the future, a mine falls short (often considerably short) of its claimed returns and closes early.

## COMPANY TAX

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Economists generally lack the skills to calculate company tax payments and cannot predict tax payments relating to specific projects.<sup>17</sup> The application of the headline company tax rate to surpluses estimated in cost benefit analysis, as Deloitte does in the Winchester South EIS, is certain to overstate tax payments that can be reduced by a range of more and less legitimate factors. The most obvious demonstration of this is data on Whitehaven’s actual company tax payments, shown in Table 2 below:

**Table 2: Whitehaven’s income and tax payments**

Financial year	Revenue (\$m)	Taxable income (\$m)	Tax payable (\$m)	Effective tax rate
2013-14	\$1,041	loss	0	No tax paid
2014-15	\$1,079	loss	0	No tax paid
2015-16	\$1,578	loss	0	No tax paid
2016-17	\$2,398	loss	0	No tax paid
2017-18	\$2,308	loss	0	No tax paid
2018-19	\$2,535	\$297	\$17	5%

Source: Australian Taxation Office (2020) *Corporate Tax Transparency*

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<sup>17</sup> Campbell (2015) *Draft guidelines for economic assessment of mining and coal seam gas proposals Submission*, <https://www.tai.org.au/content/draft-guidelines-economic-assessment-mining-and-coal-seam-gas-proposals>

Table 2 shows that in most years Whitehaven does not pay company tax at all, with only one payment in the 2018-19 following high coal prices in 2017-18. Deloitte make no attempt to explain why this trend would be changed, despite estimating the project would pay almost \$2 billion in undiscounted taxes.

This problem is widespread in commissioned economic assessment. In 2018 The Australia Institute highlighted that economic modelling of tax payments by Australian oil and gas projects has notoriously over-estimated actual tax payments, as shown in Table 3 below:<sup>18</sup>

**Table 3: Economic assessment of tax payments from oil and gas projects**

Company/project	Consultants	Full report available?	Key tax claims	Comments on actual federal tax paid
<b>Offshore Projects</b>				
<b>Chevron - Gorgon/Wheatstone</b>	ACIL Allen 2015	No	\$338 billion in federal taxes to be paid from 2009 to 2040 <sup>19</sup>	Chevron paid no corporate tax in 2013/14, 2014/15 and 2015/16 despite reporting revenue totalling \$9.2 billion for those three years
<b>Inpex - Ichthys</b>	ACIL Allen	No	\$73 billion in total taxes to be paid from 2012 to 2050 <sup>20</sup>	Inpex reported revenue totalling \$4.6 billion for 2013/14, 2014/15 and 2015/16 and paid only \$0.1 billion in corporate tax for those three years
<b>Shell - Prelude</b>	Internal	No	\$12 billion in taxes will be paid <sup>21</sup>	Prelude will start production in 2018. Shell reported revenue totalling \$47.5 billion for 2013/14, 2014/15 and 2015/16 and paid only \$1.1 billion in corporate tax for those three years.
<b>Onshore Projects</b>				
<b>Santos - Narrabri</b>	ACIL Allen (2016)	Yes	\$1.4 billion in company taxes to be paid 2017 to	Santos paid no corporate tax in 2014/15 and 2015/16 and only \$3

<sup>18</sup> Campbell and Shields (2018) *We'll pay tax ....one day: Submission to Senate Inquiry into Corporate Tax Avoidance*, <https://australiainstitute.org.au/report/well-pay-tax-one-day-submission-to-senate-inquiry-into-corporate-tax-avoidance/>

<sup>19</sup> ACIL Allen (n.d.) *A Snapshot Of Chevron's Realised And Forecast Economic Benefits In Australia* [http://www.acilallen.com.au/cms\\_files/ACILAllen\\_Chevron2015.pdf](http://www.acilallen.com.au/cms_files/ACILAllen_Chevron2015.pdf)

<sup>20</sup> ACIL Allen (n.d.) *An Economic Impact Assessment: The Ichthys LNG Project* [:http://www.inpex.com.au/media/2967/2240\\_acil-allen-brochure-2\\_web.pdf](http://www.inpex.com.au/media/2967/2240_acil-allen-brochure-2_web.pdf)

<sup>21</sup> Validaris (2013) *Prelude project will inject \$45bn to Australian economy: Shell* <https://www.australianmining.com.au/news/prelude-project-will-inject-45bn-to-australian-economy-shell/>

			2042 (\$3.1b in total taxes to be paid) <sup>22</sup>	million in corporate tax in 2013/14. Over those three years it reported revenue totalling \$11.2 billion.
<b>Coal seam gas development in Qld</b>	ACIL Tasman (2012)	Yes	\$228 billion in federal taxes to be paid from 2011 to 2035 <sup>23</sup>	Qld coal seam gasfields have produced less gas than forecast and the three Gladstone LNG have had larger writedowns indicating tax paid will be much less than forecast.
<b>Arrow LPNG plant</b>	AEC Group (2011)	Yes	\$13.1 billion in federal taxes to be paid from 2013/14 to 2029/30 <sup>24</sup>	Arrow's parent company, Shell reported revenue totalling \$47.5 billion for 2013/14, 2014/15 and 2015/16 and paid only \$1.1 billion in corporate tax for those three years.
<b>APPEA – Economic impact of shale and tight gas development in the NT</b>	Deloitte Access Economics (2015)	Yes	\$961 million increase in NT Government revenue over the period 2020-2040 <sup>25</sup>	Later report for NT Fracking Inquiry by ACIL Allen found “very high” probability of “failure to commercialise”. <sup>26</sup>

Sources: see footnotes and ATO (2017) *Corporate Tax Transparency*, <https://data.gov.au/dataset/corporate-transparency>

Company tax payments from the Winchester South project are unlikely to materialise at all, let alone levels estimated by Deloitte. Decision makers should take this into consideration.

<sup>22</sup> ACIL Allen (2016) *Narrabri Gas Project – Economic Impact Report*, p30

<sup>23</sup> ACIL Tasman (2012) *Economic significance of Coal Seam Gas in Queensland*, p101  
[http://www.acilallen.com.au/cms\\_files/ACIL\\_CSG\\_Queensland\\_2012.pdf](http://www.acilallen.com.au/cms_files/ACIL_CSG_Queensland_2012.pdf)

<sup>24</sup> AEC Group (2011) *Economic Impact Assessment: Arrow LNG Plant*, p56.

<sup>25</sup> Deloitte (2015) *Economic impact of shale and tight gas development in NT*,  
[https://www.appea.com.au/wp-content/uploads/2015/08/APPEA\\_Deloitte-NT\\_Unconv\\_gas\\_FINAL-140715.pdf](https://www.appea.com.au/wp-content/uploads/2015/08/APPEA_Deloitte-NT_Unconv_gas_FINAL-140715.pdf)

<sup>26</sup> ACIL Allen (2017) *The economic impacts of a potential shale gas development in the Northern Territory*, <https://frackinginquiry.nt.gov.au/inquiry-reports?a=465934>

# Environmental costs

Deloitte's analysis of Winchester South's impact on greenhouse gas emissions is limited. As the world attempts to keep carbon out of the atmosphere, this project is designed to take tens of millions of tonnes of carbon out of the ground and into the atmosphere.

Basic economic theory is that increasing the supply of a good reduces its price and, all other things being equal, increases its consumption. To some degree, this project would decrease the price of coal and result in more coal being burned in the world. Deloitte fail to discuss this. The size of scope 1 and 2 emissions is discussed but the critical scope 3 emissions are not even mentioned. This is a major omission.

## MINE REHABILITATION

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As a marginal project, it is likely that if the coal market declines, Winchester South will become uneconomic earlier than its planned 30 year life, leaving a mining pit to be rehabilitated. History shows that the rehabilitation of Australian mines is very poor. There are no Australian examples of major, modern open cut mines completing rehabilitation to the point where the site can be relinquished.<sup>27</sup> Whitehaven, has a poor environmental record which it has tried to hide.<sup>28</sup> In 2020 it pleaded guilty to significant breaches of mining laws relating to the environment.<sup>29</sup> Whitehaven's revenue comes entirely from coal and 85% comes from thermal coal.<sup>30</sup> This places it in a worse position to rehabilitate mines than diversified miners that can use the income generated from their other mines to fund rehabilitation. Whitehaven's considerable debt further reduces the likelihood of Whitehaven having the funds to carry out rehabilitation. In October 2020 Whitehaven had to ask its lenders for debt

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<sup>27</sup> Campbell et al (2021) *Dark side of the boom*, <https://australiainstitute.org.au/report/dark-side-of-the-boom/>

<sup>28</sup> Sturmer (2017) *Whitehaven Coal documents showing environmental breaches raise concerns*, <https://www.abc.net.au/news/2017-08-04/whitehaven-coal-environment-licence-breaches-raise-concerns/8771156>

<sup>29</sup> Cox (2020) *Whitehaven Coal pleads guilty to breaching mining laws causing 'significant environmental harm* <https://www.theguardian.com/business/2020/dec/11/whitehaven-coal-pleads-guilty-to-breaching-mining-laws-causing-significant-environmental-harm>

<sup>30</sup> Whitehaven Coal (2021) *Annual Report*, p13, <https://whitehavencoal.com.au/asset/annual-reports/>

relief.<sup>31</sup> Banks themselves are becoming reluctant to lend to coal companies as they grow concerned about declining coal demand and rehabilitation liabilities.

There is the significant possibility that the Queensland Government will be left with the responsibility of rehabilitating the site if it is abandoned. This is not discussed in the Deloitte assessment, nor even considered as a possibility.

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<sup>31</sup> Ker (2020) *Whitehaven won't alter dividend policy despite setbacks*,  
<https://www.afr.com/companies/mining/whitehaven-won-t-alter-dividend-policy-despite-setbacks-20201022-p567mf>

# Project assessment literature and over-estimation of net benefits

The over-estimation of benefits, and underestimation of costs, seen in the Winchester South economic assessment is typical of project assessment generally. There is an extensive literature on systemic biases in project assessment. These biases mean a project will rarely provide the benefits estimated in assessment documents and will often underestimate costs and risks. These biases are:

- Strategic misrepresentation – project promoters over-state benefits and under-state the costs in order to get a project approved;
- Over-optimism – proponents are, on average, naturally over-optimistic;
- Planning fallacy – humans often fail to imagine all the ways a project could go wrong;
- Principal-agent problem – the incentives faced by consultants like Deloitte are to produce analysis favourable to their clients. Within proponent companies, management are not necessarily to make profits. Often managers are incentivised to pursue growth or other goals rather than investors' interests, and management often leave a company before the consequences of poor project selection and development are felt.

These biases have been highlighted by scholars such as economics Nobel Prize winner Daniel Kahneman and colleague Amos Tversky as well as the world's most cited megaproject scholar, Bent Flyvbjerg.<sup>32</sup> Flyvbjerg explains why project modelling should be treated sceptically:

Success in megaproject management is typically defined as projects being delivered on budget, on time, and with the promised benefits. If, as the evidence indicates, approximately one out of ten megaprojects is on budget,

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<sup>32</sup> Kahneman & Tversky (1979) *Prospect theory: An analysis of decisions under risk*, *Econometrica*, 47, p 313–327; Kahneman & Tversky (1979) *Intuitive prediction: Biases and corrective procedures*, in Makridakis & Wheelwright (eds) *Studies in the Management Sciences: Forecasting*, vol 12. Flyvbjerg (2008) *Curbing Optimism Bias and Strategic Misrepresentation in Planning: Reference Class Forecasting in Practice*, [European Planning Studies](https://www.researchgate.net/publication/233258056_Curbing_Optimism_Bias_and_Strategic_Misrepresentation_in_Planning_Reference_Class_Forecasting_in_Practice) 16:3-21, p9  
[https://www.researchgate.net/publication/233258056\\_Curbing\\_Optimism\\_Bias\\_and\\_Strategic\\_Misrepresentation\\_in\\_Planning\\_Reference\\_Class\\_Forecasting\\_in\\_Practice](https://www.researchgate.net/publication/233258056_Curbing_Optimism_Bias_and_Strategic_Misrepresentation_in_Planning_Reference_Class_Forecasting_in_Practice)

one out of ten is on schedule, and one out of ten delivers the promised benefits, then approximately **one in one thousand projects is a success**, defined as “on target” for all three. Even if the numbers were wrong by a factor of two—so that two, instead of one out of ten projects were on target for cost, schedule, and benefits, respectively - the success rate would still be dismal, now eight in one thousand. This serves to illustrate what may be called **the “iron law of megaprojects”**: **Over budget, over time, over and over again. Best practice is an outlier, average practice a disaster** in this interesting and very costly area of management.<sup>33</sup>

**More often than not the information that promoters and planners use to decide whether to invest in new projects is highly inaccurate and biased making plans and projects very risky.**<sup>34</sup>

While Flyvbjerg focuses on ‘megaprojects’, projects larger than Winchester South, the systemic biases towards over-statement of profits and understatement of costs and time to completion is widespread in the resources industry. In 2014, Christopher Haubrich, a mining analyst, gave a paper titled “Why Building a Mine on Budget is Rare: A Statistical Analysis”.<sup>35</sup> Haubrich constructed a database of 50 mining projects and found that capital cost overruns are significant and persistent with average cost overruns of 20%–60% recorded since 1965. Many projects run over cost by much greater percentages – as shown in Figure 4 below:

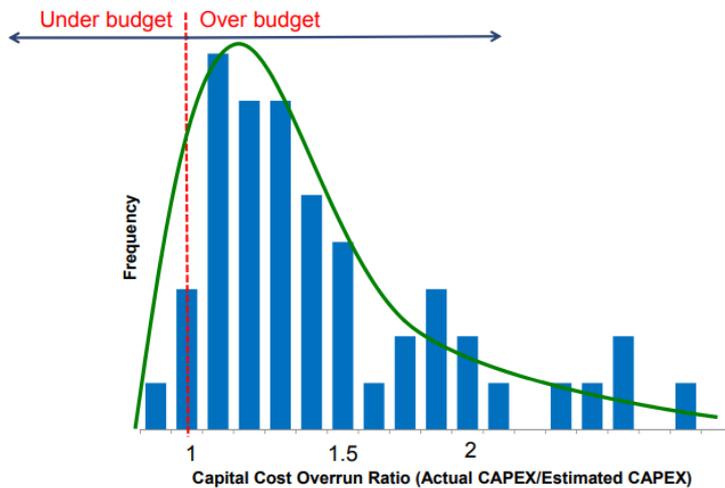
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<sup>33</sup> Flyvbjerg (2014) *What you should know about megaprojects and why: An Overview*, p11, emphasis added, [https://www.researchgate.net/publication/261411676\\_What\\_You\\_Should\\_Know\\_About\\_Megaprojects\\_and\\_Why\\_An\\_Overview/link/59fbaad60f7e9b9968bb03ff/download](https://www.researchgate.net/publication/261411676_What_You_Should_Know_About_Megaprojects_and_Why_An_Overview/link/59fbaad60f7e9b9968bb03ff/download)

<sup>34</sup> Flyvbjerg (2008) *Curbing Optimism Bias and Strategic Misrepresentation in Planning*, p5, emphasis added.

<sup>35</sup> Haubrich (2014) *Why Building a Mine on Budget is Rare: A Statistical Analysis*, 16 October 2014, [http://www.canadian-german-mining.com/files/events/2014-10-16\\_CIM\\_MES\\_Rocks\\_Stocks/3\\_Chris\\_Haubrich\\_Why\\_Building\\_A\\_Mine\\_on\\_Budget\\_is\\_Rare\\_-\\_A\\_Statistical\\_Analysis.pdf](http://www.canadian-german-mining.com/files/events/2014-10-16_CIM_MES_Rocks_Stocks/3_Chris_Haubrich_Why_Building_A_Mine_on_Budget_is_Rare_-_A_Statistical_Analysis.pdf)

**Figure 4: Distribution of Capital Cost Overruns**



Source: Haubrich (2014), p22.

Figure 4 shows that only one of the mining projects in Haubrich’s sample saw capital costs below what had been estimated, three came in on budget, and the vast majority saw cost overruns between 1.1 and 2 times what was estimated. Blowouts past double expected capital costs were not uncommon.

Furthermore, Haubrich found that that marginal projects are likely to have larger cost overruns. Haubrich stated that this was because when projects are marginal, the incentive is to “sharpen your pencils” and reduce cost estimates in order to make the project numbers viable. Interestingly, Haubrich found no relationship between the cost of the project and cost overruns.

Other research has made similar findings to Haubrich.

McKinsey found more than four out of five mining projects come in late and over budget, by an average of 43%.<sup>36</sup>

KPMG found across seventeen greenfield projects the average cost overrun was 95% above original estimate.<sup>37</sup>

<sup>36</sup> McKinsey (2017) *Getting big mining projects right: Lessons from (and for) the industry*, <https://www.mckinsey.com/industries/metals-and-mining/our-insights/getting-big-mining-projects-right-lessons-from-and-for-the-industry#>

<sup>37</sup> KPMG (2015) *Insights into Mining: Issue #4*, <https://assets.kpmg/content/dam/kpmg/pdf/2015/08/insights-into-mining-issue-4-july-2015.pdf>

EY found that mining projects run over-budget by an average of 62%, and that 50% of projects report delays. Only 31% of projects came in on budget. EY quoted media coverage of some projects with cost overruns:

A major copper and gold operation in Central Asia: The National Finance Minister had been quoted as saying: “No one understands why the project has gone US\$2b over budget.”

A major iron ore project in Brazil: To date, the project has experienced an overrun from the initial estimate of approximately 690%. The chief executive officer of the company has gone on record to say that “they are working very hard” to ensure no more delays or cost overruns on the project.

A Brazilian megaproject: This project saw capital costs escalate from US\$3.6b in 2007 to US\$8.8b in 2013. Media sources have described this investment as one of this organization’s “most significant failures of recent years.”<sup>38</sup>

Notably all these studies just focus on cost over-run rather than revenue shortfall. When the likelihood of a revenue shortfall is factored in (ie both forecast price *and* forecast production are likely to be over-optimistic), it would be rare that a mining project actually does provide the net benefits it claims.

It is worth repeating the words of Flyvbjerg.

If, as the evidence indicates, approximately one out of ten megaprojects is on budget, one out of ten is on schedule, and one out of ten delivers the promised benefits, then approximately one in one thousand projects is a success, defined as “on target” for all three.

More often than not the information that promoters and planners use to decide whether to invest in new projects is highly inaccurate and biased making plans and projects very risky.

It is against this background literature on project assessment that Winchester South should be examined.

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<sup>38</sup> EY (2015) *Opportunities to enhance capital productivity: Mining and metals megaprojects*, [http://www.ey.com/Publication/vwLUAssets/EY-opportunities-to-enhance-capital-productivity/\\$FILE/EY-opportunities-to-enhance-capital-productivity.pdf](http://www.ey.com/Publication/vwLUAssets/EY-opportunities-to-enhance-capital-productivity/$FILE/EY-opportunities-to-enhance-capital-productivity.pdf)

# Conclusion

Winchester South is a marginal project. It appears strange that Whitehaven Coal is seeking approval to develop it future coal demand will decline. It is also strange that Winchester South will produce lower grade coal when Whitehaven states its intention to concentrate on higher grade coal. The option value of planning approval, optimism bias and management incentives explain why. The claimed benefits to the Queensland community have been exaggerated and the economic externalities (particularly scope 3 emission and risk to groundwater) have been not valued or under-valued. Gaming the mining approvals process should be discouraged. The application should be rejected.