Submission to the Independent Planning Commission

Context and Expertise

I am a financial analyst based in Hong Kong with ties to the local community of Lue. I object to the Bowdens Silver Project as the risks to the community far exceed any perceived benefit to the state My current role is as a portfolio manager of a Global Food and Agriculture equity strategy. I have substantial experience in valuing projects and in the pricing of carbon credits and my analysis to areas in which I have some level of expertise.

Sources Used

The primary sources referred to in this submission are the Economic Assessment of Bowdens Silver Project, May 2020 by Gillespie Economics (GE) and Bowdens Silver Mine Economic Analysis Peer Review, January 2022 by The Centre for International Economics (The CIE) (together "the reports"). Further sources used are detailed in the references.

Summary of Findings

With reference to the reports provided by GE (2020) and CIE (2022) using current real-world data, the cost-benefit analysis (CBA) produced shows that the Bowdens Silver Mine ("the project", "the applicant") represents a net cost to the State of NSW and thus should be refused. As detailed cashflow analysis for the project was not provided (note 1) specific analysis of these cashflows has not been conducted as part of this submission however context as to the validity of the assumptions underlying these cashflows is given. This submission contains three key areas of disparity between current data and the assumptions used in the reports; Greenhouse Gas Emissions, Assumptions Regarding Royalties and Taxes, and Impacts on Agriculture and Tourism.

Greenhouse Gas Emissions

According to the CIE report, the largest economic cost of the project is associated with greenhouse gas emissions. The CBA produced by the CIE showed a cost of -$10m (scope 1) and -$41m (scope 2). The CIE used EU Carbon Permits (as is standard) as the metric for valuing the cost of carbon emissions, at the time of writing (Feb 2023) EU Carbon Permit's trade at EUR104.63 (AUD162.176) which would result in a cost to the state of AUD-72.1m (scope 1) to -131m (scope 2).

Table 1: Costs of Scope 1 and 2 Emissions

EU Carbon Permits	104.63
in AUD (AUD/EUR 0.64)	162.1765

Scope	Amount	Cost AUD
Scope 1	444,500	72,087,454.25
Scope 2	812,000	131,687,318.00

Assumptions Regarding Royalties and Taxes:

Volatility in Silver Prices

As the applicant has stated on multiple occasions silver is the main driver of revenue. Commodity prices by nature are volatile and silver has seen significant volatility. It is acknowledged that the methods used by both GE and the CIE (Financial Institutions/ World Bank) to estimate the price of silver are appropriate, however, it is important to provide necessary colour to the volatility of these forecasts. There are currently over 1 bn oz of silver reserves in various stages of development globally, whilst the market balance is currently in deficit after 5 years of surplus global stocks of silver remain high. This surplus stocking has resulted in a non-traditional supply-demand dynamic for silver markets not acknowledged by either GE or the CIE, and as such long-term projections come with a high degree of error, and as such the more conservative projection should be used. Given this extremely uncertain pricing environment and the relatively high levels of breakeven costs for the applicant, the continued operation is far from assured.

All-in Sustaining Cost Assumption

Perhaps the most glaring assumption not critically analysed is the use of an All-in sustaining cost (AISC) of USD12.94 obtained from the Feasibility Study published by the proponent in June 2018. At the time of the feasibility study this AISC figure was highly embellished in favour of the applicant and now given the global economic environment is entirely inaccurate. Few projects with silver as the primary revenue source that are currently operating have an AISC as high as the proponents. Thus the ability of the applicant to continuously operate over the life of the project is uncertain.

GE (2020) stated *"the results are most sensitive to changes in operating costs. A sustained 16% increase in operating costs would result in zero net economic benefits to NSW. However, as identified above, the operating costs assumed for the Project are 15% greater than the average globally. Also, S&P (2019) indicates that silver's global average all-in sustaining cost have been on a downward trend since 2012."* GE has blatantly misrepresented the content of the S&P report as the primary factor for a reduction in AISC was the increased occurrences of unprofitable silver mines closing or going into care and maintenance and the shift from non-primary silver producers to other metals. *"The main driver of the global silver AISC decrease on a coproduct basis has been the poor performance of silver prices compared with the metals it is commonly mined with, such as gold, copper, lead and zinc. Silver was the hardest-hit price in this peer group after 2012 and has had the poorest recovery since. The declining silver price is one of the main reasons the costs of primary and nonprimary silver mines have diverged since 2017. The coproduct method of costing at polymetallic mines splits the costs between the different products based on the respective net revenues they generate. Lower silver prices relative to other metals have led to lower silver revenues, which result in less cost being allocated to silver on a coproduct basis."* S&P(2019). In addition, S&P (2019) stated that the primary silver mines (the category of the applicant) had an increase in AISC over the period 2017-2019.

CPI inflation from the time of publication of the feasibility study (2018) to the time of writing (Feb 2023) is 14.7% applying this increase would equate to an AISC of USD14.84 which would erode all most all of the net benefit to the state based on the 16% cost increase figure given by GE. The reality of cost increases for primary miners is more severe, Cannington another Australian primary silver mine saw costs increase from 10.15 in 2018 to 11.85 in 2022 (16.7%) (Charts 1 and 2). At a minimum, the applicant would see AISC increases at this 16.7% level and more likely significantly higher given that Cannington is an established mine. Moreover, Chart 2 shows a significant steepening of the cost curve when compared to Chart 1 indicating substantial increases in the cost of silver mining globally.

Chart 1: Cannington Total Cash Cost 2018 (USD10.15) (source: S&P)

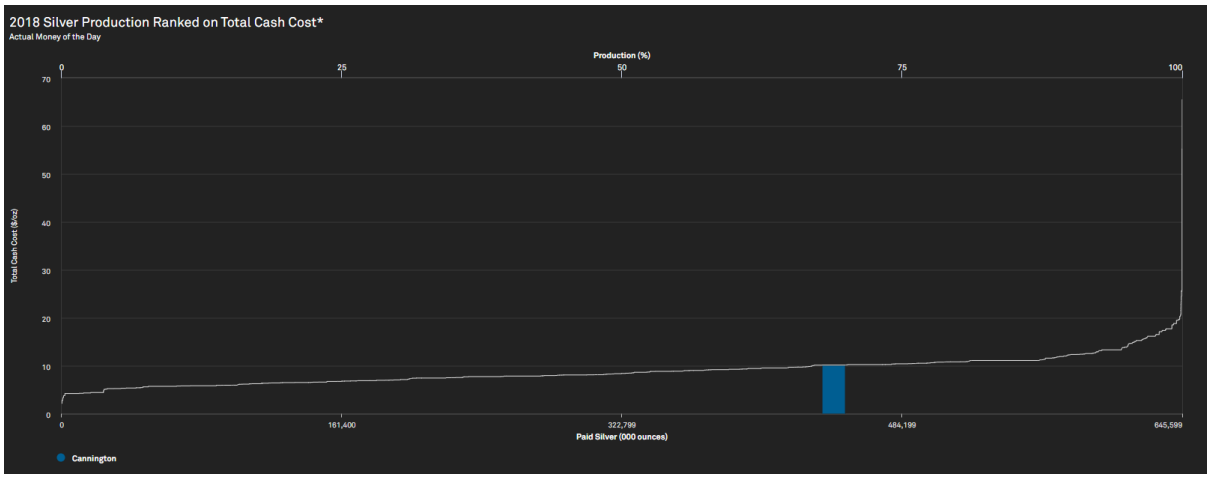
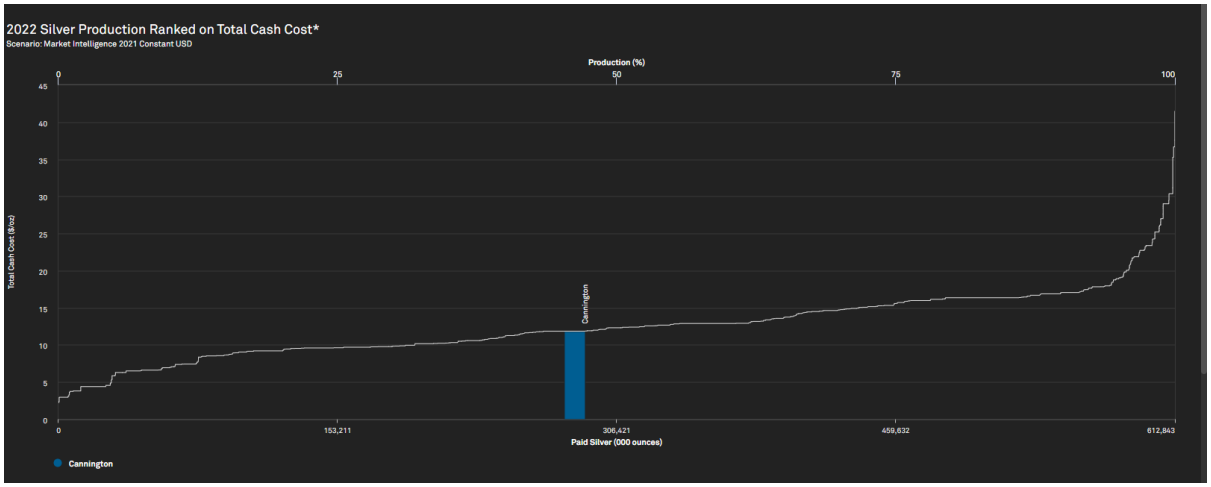


Chart 2: Cannington Total Cash Cost 2018 (USD11.85) (source: S&P)



As stated by GE (2020) a 16% sustained increase in operating costs would result in zero net economic benefit to NSW. The real-world evidence observed shows that this threshold has been breached without a commensurate increase in the price of silver and the project would result in zero net economic benefit to NSW.

Whilst the department seemed to have ignored the relevance of the economics of the project it is a vital part of the approval process given that the proponent will hold no other revenue sources outside of the site should the mine be forced into care and maintenance due to accelerating costs or a drop in the silver price the costs of upkeep and the costs would fall to the state. **At a minimum, the department should require an independent review of the expected costs rather that relying on an AISC of USD12.94 per ounce provided by the proponent in 2018.**

Impacts on Agriculture and Tourism

Tourism and Agriculture represent significant portions of the local economy, GE (2020) stated that 'Other agricultural activities would not be impacted by the Project.' thus placing a zero probability of contamination from mine waste products in the local community. Heavy metal contamination in

agriculture can occur from Ag/Pb/Zn mining through dust generated from the mine or through groundwater. Based on global studies of Ag/Pb/Zn mining (Reglero et al., 2009, Sijin, Yeyao and Xuan, 2015,) the risk of heavy metal contamination to agriculture is significant and should not have a zero probability applied and thus an expected value should be applied (probability of contamination * value of damage should contamination occur).

Wine and Tourism

Tourism in Mudgee is highly dependent on the local wine industry. According to the Mudgee Regional Tourism 2020-2021 annual prospectus in 2019 ("The Tourism Prospectus"), tourism brought AUD 171 m to the local economy with this figure estimated to now be in excess of AUD 200m. As multiple publications state the wine industry is the main attraction in Mudgee thus any impact on the wine industry would have significant carryover effects on the local tourism industry. The wine industry produces 14 million bottles per year (est.AUD140m in revenues). Wine like all other foods is subject to heavy metals testing, Food Standards Australia states the limits of reporting for metals in table 2. Evidence from Bulgaria (Angelova et al., 1999) from areas surrounding non-ferrous-metal works shows the presence of heavy metals that would far exceed Australian limits.

Table 2: Limits of Heavy Metals

Metal	Limit of reporting mg/kg
Antimony	0.002
Arsenic, total	0.01
Arsenic, inorganic	0.05
Cadmium	0.005
Copper	0.01
Lead	0.01
Mercury, total	0.002
Mercury, organic	0.0005
Selenium	0.01
Tin	0.01
Zinc	0.01

Source: Food Standards Australia

Any contamination of local agriculture from Lead, Arsenic, Mercury, or Zinc (all of which are present in significant quantities in the project) would result in a loss of produce for the local wine industry and would result in a significant impact on the local economy. Given the density of wine production in the region it is likely that should contamination occur it would affect a majority of producers. Whilst as stated by the proponent risk of heavy metal contamination is minimal it should still be given a risk probability of at least 1% over the life of the project. As heavy metal contamination is

long-lasting (Davies et al., 1985, Davies, 1987) and the effects of this could damage local Food, Agriculture, and Tourism industries into perpetuity. On conservative rough estimates of local production from agriculture, wine, and tourism and valuing these industries as a perpetuity (10% discount rate, 3% growth rate) would result in a value of AUD 4.857bn. Assuming a 50% reduction to values results in a 2.429bn value damage should contamination occur. Thus the correct value for the impact on agriculture and tourism for the purposes of CBA should be 24.285m (0.01*2.428bn). Moreover, should contamination of local food and agriculture occur the loss to producers would exceed the estimated cashflows of the applicant thus full compensation from the applicant would not be possible.

Other Inappropriate or Out-of-Date Assumptions Used In CBA

Discount Rates

The discount rate used by GE (2020) and CIE (2022) was 7%, at the time of publication of the GE Report the industry standard discount rates for an Australian project with uncertain cashflows were >10%. Given the current economic environment and increases in interest rates, an appropriate discount rate would be 14%. Without the cashflow data used to make the CBA, it is not possible to give an accurate assumption of the reductions in present values of royalties and company tax however given the disparity between the discount rate used and the appropriate rate the downward reductions would be significant.

Third Party Royalties

Third Party Royalties have been included in the CBA. The identity of the "Australian third party" has not been identified and the assumption that this benefit would accrue to NSW is inappropriate. This royalty is likely for an early-stage investor, without identification of this investor the assumption that this would accrue 100% to Australian shareholders (pro-rata to NSW) is inappropriate and it should be excluded from the CBA.

Amended CBA Current Assumptions

Table 3 shows an amended CBA using data provided by GE and CIE and using current real-world data As data used for determining company tax and government royalties was not provided the CIE estimates were retained for government royalties and company tax. Residual producer surplus, supplier benefits, wage premium benefits, wage benefits of employment, and non-market benefits of employment are not areas of my expertise therefore the estimates used by the CIE have been retained.

Table 3 - Benefits and Costs to NSW

	GE	CIE	Actual
Production benefits			
Government royalties	21	19.7 to 23.6	19.7 to 23.6
Australian third party royalties	4	5	NA
Company tax	15	10.4 to 12.4	10.4 to 12.4

Residual producer surplus	4	5	5
Supplier benefit	0	0	0
Wage premium benefits	-	2.2	2.2
Total production benefits	44	42.4 to 48.3	37.3 to 12.4
Public Impacts			
Wage benefits of employment	25	0	0
Non-market benefits of employment	78	0	0
Greenhouse gas emissions	0	-(10 to 41)	-(72.1 to 131.7)
Other industry impacts	0	0	-24.3
Total public impacts	103	-(10 to 41)	-(96.4 to 156)
Net Benefit/ Cost			**-(61.5 to 121.1)**

Conclusion and Comments

The economic realities of the Bowdens Silver Project are clear, the project will not only provide zero net benefits to the State it will likely have a net cost to the State and the LGA. Given current data, the reports provided by GE for the applicant and the CIE for the department show that the project would provide a likely cost to NSW of $61.5m (minimum using scope 1 emissions). The risks from the project are substantial and at a minimum further analysis is required particularly on the viability of the project. Whilst based on the guidelines the economics of the project are not taken into account, the viability of the project throughout its life is of critical importance given the potential risk that Ag/Pb/Zn mining represents. The decision by the DPIE to approve the project is perplexing, favouring mining of a dangerous and abundant mineral over food and agriculture is significantly out of touch in the global context given the facts on the ground. The evidence is clear multiple studies show that Ag/Pb/Zn does not mix with agriculture and certainly should not exist in such proximity to a community.

Note 1: Further analysis of tax payable and royalties has not been made possible as cashflow data was not made available despite requests to CIE, GE, and the applicant. I would be more than happy to conduct a detailed analysis of these cashflows and create an amended CBA should they be provided to the public at a later date.

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