

Fingerboards Mineral Sands Project

Supplementary report on centrifuge use for water recovery and tailings management

The proposal to use centrifuges in the Fingerboards project would be a “significant” increase in capital costs, with the aim of reducing environmental costs.

The unorthodox and non-transparent approach taken in the economic assessment of the project makes it difficult to assess the impacts of the centrifuge proposal, but it is clear that benefits remain overstated and costs understated.

Rod Campbell

March 2021

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Summary

1. The Fingerboards mineral sands project is a proposal to mine zircon, rutile, ilmenite and other minerals from deposits adjacent to the Mitchell River near Bairnsdale, East Gippsland, Victoria. The proposal is currently before an Inquiry and Advisory Committee.
2. In an earlier report to the Committee I outlined my view that the original economic assessment overstated the economic case for the project exaggerating benefits and understating costs.
3. The proponents have submitted a proposal to use centrifuges in tailings management to hopefully reduce the impact of the project on water resources. While data is limited, the economic implications of this proposal appear to be:
 - a. Significant increase in capital cost that would likely weaken the financial case for the project and reduce any company tax payments.
 - b. Increase operating costs, particularly in relation to electricity. In turn, this would increase the greenhouse emissions of the project. The climate impacts of the project have been understated in earlier assessment.
 - c. Reduce impacts on water, dust and potentially noise. The moves to reduce these impacts contradicts the approach taken in the earlier economic assessment. That assessment assumed that previous management options would already perfectly offset any impacts.
4. The original economic assessment included a large value for supplier benefits. This calculation was in the consultant's own words "at best speculative" and has been described in the NSW Land and Environment Court as "inflated" and "plainly wrong". Putting the logical and technical objections to this value aside, the centrifuge proposal appears to substantially reduce this benefit.
5. It remains my opinion that the economic case for the Fingerboards project has been misrepresented, with benefits overstated and costs understated. The proposal for centrifuge use would have been relatively simple if data was provided and if the original cost benefit analysis had followed standard methods. Unfortunately, this is not the case, adding to the uncertainty around the economics of the project.
6. Declaration: I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.

Introduction

7. The Fingerboards mineral sands project is a proposal to mine zircon, rutile, ilmenite and other minerals from deposits adjacent to the Mitchell River near Bairnsdale, East Gippsland, Victoria. The project site is adjacent to horticultural cropping and other agricultural businesses, some of which oppose the project due to potential impacts on their businesses and the environment.
8. The project proponent, Kalbar Resources, commissioned an Environmental Effects Statement (EES), including an Economic Impact Assessment written by consultants BAEconomics. I was instructed to review the economic aspects of the EES by Environmental Justice Australia (EJA), a law firm representing Submitter No. 813, a local community group that opposes the Fingerboards project. In January 2021 I wrote an expert report titled *Fingerboards Mineral Sands Project: Expert report to Inquiry and Advisory Committee on economic impact assessment*, which was provided to the Fingerboards Mineral Sands Project Inquiry and Advisory Committee.
9. Subsequently, Kalbar has changed the project and incorporated centrifuges into the processing stage of the project. In regards to this change I have reviewed the following documents:
 - a. Fingerboards Mineral Sands Project Inquiry and Advisory Committee Technical note: Implementation of centrifuges for water recovery and tailings management (the Technical Note).
 - b. Updated project description Chapter 3 of EES with tracked changes (updated project description).
 - c. Expert Witness Statement of Ivan Saracik 8 February 2021.
10. I have also made phone and email inquiries regarding the costs of centrifuges to engineering firm Alfa Laval. At time of writing I have not received a response with any details.
11. The above documents contain very little information to inform economic assessment and to my knowledge the BAEconomics study has not been updated. While little data is provided, from an economic perspective the change to centrifuges looks to increase financial costs in order to reduce environmental costs. More specifically this change appears to have the following effects:
 - a. Increase capital costs, with purchase of the centrifuges and associated infrastructure, with some cost saving from reduced tailings storage costs.

- b. Increase operating costs, including electricity use, which would also increase greenhouse gas emissions.
- c. Reduce impacts on water
- d. Reduce impacts of dust
- e. Ambiguous impact on noise.

12. A key use of cost benefit analysis as an economic tool is to compare different options for projects and assess these kinds of trade off. If the BAEconomics cost benefit analysis had been conducted in a standard, transparent way, and if data on centrifuge costs were provided by Kalbar, this change to the project could easily be assessed and its impact on overall project value and particular impacts could be estimated.

13. Unfortunately, the BAEconomics cost benefit analysis is not presented in a way that helps analyse this change to the project. As discussed in my earlier report, BAEconomics present no breakdown of costs and revenues, which could have been adjusted to assess the centrifuge option. Instead, BAEconomics present only an aggregated estimate of company tax and royalty payments, with minimal transparency on how this figure was arrived at, or the level of uncertainty around it. With or without the centrifuge change, in my view, decision makers are flying blind on the economics of the Fingerboards project. In the following sections I discuss the impacts mentioned above based on the limited information available.

Capital costs

14. No estimate of the increased capital costs of the centrifuges is provided in the above documents. The Technical note mentions only that “the additional investment is significant” (page 9) and that other mineral sands mines had decided “not to implement them [due to] cost considerations” (page 5).
15. A significant increase in capital costs should be of concern to assessment authorities as this will affect the overall financial situation of the project and its capacity to provide economic benefits such as employment and increases the risk that operations do not proceed as planned. In the worst case scenario, financially insecure mines are abandoned imposing significant costs on the public, as occurred in the case of the Benambra/Stockman project and other examples discussed in my earlier report.
16. The increase in costs would also work to reduce the benefit of tax payments of the project. This demonstrates the point in my earlier report, that the BAEconomics estimate of tax payments is simplistic and overstated.

Operating costs

17. No estimate of the increased operating costs of the centrifuges is provided in the above documents. The Technical note mentions only that these costs are “slightly greater, but this is largely offset by the improved operational efficiency” (page 9) and the reduced costs for tailings management.
18. The Technical Note has no details around this change in operating cost, but the Updated Project Description shows a change of power demand from 9,000 to 14,000 kilovolt-amperes, an increase of more than 50%. This would in turn lead to a significant increase in Scope 2 greenhouse gas emissions.
19. The EES estimates total emissions from the Fingerboards project at just over one million tonnes. The BAEconomics assessment understates the value of this impact, with an estimate of \$10,000. Two points need to be made regarding this estimate.
20. Firstly, this is based on a low cost of \$13.52 per tonne of CO₂ equivalent emitted. This estimate is based on prices paid in 2018 by the Australian Clean Energy Regulator under the Federal Government’s Emissions Reduction Fund.
21. These prices reflect the prices paid in one auction for emissions reduction, not the social cost of CO₂ pollution. Bidders to the Emissions Reduction Fund face a range of incentives beyond government payment for emissions reduction, such as landholders increasing soil carbon for agricultural purposes beyond climate impacts. It is the cost to the community of carbon emissions that is relevant to a cost benefit analysis. While this cost is uncertain and estimates vary, the BAEconomics estimate is low by global standards. For example, the Biden Administration has recently published estimates centring on US\$51 per tonne for 2020 (AUD\$66/t), increasing to US\$62 per tonne in 2030.¹ Major economists such as Joseph Stiglitz and Nicholas Stern have made recent estimates at US\$100 within the lifetime of the Fingerboards project.²
22. At \$13.52 per tonne, the climate cost of the project is approximately \$13.5 million. With a social cost of carbon of \$66 per tonne, this represents a social cost of \$66 million dollars.

¹ United States Government (2021) *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990*, https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf

² Stern and Stiglitz (2021) *The Social Cost of Carbon, Risk, Distribution, Market Failures: An Alternative Approach*, <https://www.nber.org/papers/w28472>, see this figure cited also in Skibba (2021) *The Biden Administration Increases the Social Cost of Carbon*, <https://undark.org/2021/03/02/biden-weighs-social-cost-of-carbon/>

23. BAEconomics multiply the social cost of climate impacts by the “ratio of Victorian population to global population”. Victoria’s 6.6 million residents represent 0.08% of the world’s 7.8 billion people, so the cost benefit analysis includes a value of just 0.08% of the \$13.5 million cost, approximately \$10,000.
24. From a strict cost benefit analysis perspective, this approach is defensible. The scope of the analysis has been set as costs and benefits to the Victorian community, so costs to the rest of the country and the rest of the world are omitted. Consistent with this approach, BAEconomics exclude profits of the project from its analysis as these accrue to non-Victorian residents.
25. However, this approach serves to hide a significant cost of the project from decision makers, one that is likely to increase significantly under the centrifuge option. In my view, BAEconomics should have made it clear in the text of their report that an impact of this magnitude exists, even if only a fraction of it is included in the final estimate of net present value. This would provide decision makers and the community with a proper understanding of the climate impacts of the project.
26. Beyond concern about direct climate impacts of the project, greenhouse gas emissions are relevant as future carbon pricing could have a significant impact on the financial case for the project, along with other increased operating costs. Several countries are considering carbon tariffs that could be applied to Australia.³

³ Morton (2021) *Carbon tariffs: what are they and what could they mean for Australia?*, <https://www.theguardian.com/environment/2021/feb/13/carbon-tariffs-what-are-they-and-what-could-they-mean-for-australia>

Impacts on water, dust and noise

27. It is outside my expertise to interpret the changes to water impacts that the centrifuge option could bring about, described in the Technical Note. However, I note that BAEconomics assume in the EES that all water impacts were entirely offset by the previous plan for water purchases and mitigation measures. If this were accurate then the centrifuge option would not have been considered.
28. Similarly, the impact of the project on dust and air quality was estimated by BAEconomics to have been entirely negated by monitoring actions, or “acknowledged and assessed qualitatively (page 27).” Yet the Technical Note considers the mitigation of dust to be a “key design consideration” (page 8). If BAEconomics’ assumption was accurate, there would be no need for this design consideration.
29. BAEconomics also assume that noise monitoring would offset the previous noise impacts. While interpreting the changes to the noise impacts of the project from the Technical Notes is outside my expertise, the impact appears to be ambiguous. The approach taken by BAEconomics is not useful in interpreting the changes that the centrifuge option may bring.
30. All of these points reinforces my view that the BAEconomics assessment understates the external costs of the project.

Supplier benefits

31. The largest benefit of the project according to the original BAEconomics assessment is benefits to the mines suppliers. As discussed in my earlier report, this value is at best heavily overstated by BAEconomics, and may not exist at all. BAEconomics themselves have described this value as “at best speculative”. In my view, it is inappropriate that the largest benefit included in the cost benefit analysis is at best speculative.
32. Putting aside the logical and technical problems with BAEconomics’ estimate of supplier benefits, the centrifuge option would likely reduce this value. It appears from the Expert Report of Mr Saracik that the equipment would be sourced through Alfa Laval, a multinational engineering firm. Alfa Laval do not appear to have manufacturing capacity within Australia. This suggests that the centrifuge option would substitute imported machinery for locally-provided earthmoving services relating to tailings storage. By BAEconomics’ logic, this would reduce supplier benefits.
33. My earlier report highlighted that BAEconomics’ supplier benefits calculations were based on an assumption of a 22.9 percent margin from Victorian suppliers. This assumption had no source and no working. I believe the source of this estimate is the work of Steven Brown, a long-time associate of BAEconomics lead Brian Fisher. Mr Brown worked for Cadence Economics before it was acquired by Ernst and Young. Mr Brown has made similar estimates for a number of mining projects, including the Rocky Hill coal proposal, which was challenged in the NSW Land and Environment Court.
34. The NSW Land and Environment Court described Mr Brown’s approach to estimating supplier benefits as “inflated”, “shrouded in uncertainty”, “orders of magnitude different” to estimates by the NSW Government expert and based on “a number of inputs [that] seem plainly wrong”.⁴ In considering the validity of this largest value in the Fingerboards cost benefit analysis, the judgement of the Rocky Hill case has close parallels to the analysis presented in the Fingerboards project and may provide a useful comparison.

⁴ NSW Land and Environment Court (2019) *Gloucester Resources Limited v Minister for Planning*, <https://www.caselaw.nsw.gov.au/decision/5c59012ce4b02a5a800be47f>

Conclusion

35. It remains my opinion that the economic case for the Fingerboards project has been misrepresented, with benefits overstated and costs understated. The proposal for centrifuge use would increase capital costs, with the aim of reducing environmental impacts. Useful analysis of this proposal would have been relatively simple if data was provided and if the original cost benefit analysis had followed standard methods. Unfortunately, this is not the case, adding to the uncertainty around the economics of the project.

Appendix: Letter of instruction



24 February 2021

Roderick Campbell
Research Director
The Australia Institute

By email only: [REDACTED]

Dear Rod

Fingerboards Mineral Sands Mine Project, Glenaladale, Victoria

We continue to act on behalf of [REDACTED]

We advise that the proponent has notified the Inquiry and Advisory Committee (IAC) of a number of changes to the project, in particular the addition of centrifuges for water recovery and tailings management. We enclose by hyperlink:

- Letter from the proponent dated 18 January 2021 ([Document 42](#));
- Technical Note 01 which details the implementation of centrifuges for water recovery and tailings management ([Document 43](#));
- Updated EES Chapter 3: Project Description dated 8 February 2021 ([Document 122](#)); and
- Expert Witness Statement of Ivan Saracik on proposal to use centrifuges dated 8 February 2021 ([Document 130](#)).

The purpose of this letter is to seek a Supplementary Statement to address how the proposed changes impact the findings and conclusions contained in your Expert Witness Statement dated January 2021.

Instructions

1. Our client seeks a Supplementary Statement to address how the proposed changes impact the findings and conclusions contained in your Expert Witness Statement dated January 2021.
2. We request that you undertake a review of the documents above (albeit only those sections of relevance to economics) and prepare a Supplementary Statement providing your opinion on:

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Environmental Justice Australia is
the environment's legal team.
We use our specialist legal skills to
take cases to court and advocate for
better environment laws.

- a. The compliance of the economic components of the EES (as amended by the documents above) with the relevant evaluation objective in the Scoping Requirements.
 - b. The project feasibility including the predicted economic costs and benefits from construction and operation of the project, including capital investment, operating expenditure, employment and business opportunities, taxes and royalties to the regional, state and national economies, and the temporary and permanent impacts on agriculture, forest resources, tourism and businesses.
 - c. Whether the potential impacts on the existing local industries, business and landholders are identified and or appropriately assessed.
 - d. Whether the impact of commodity price fluctuation on project sustainability is appropriately assessed.
 - e. Whether engineering costs and or the potential failure of rehabilitation are adequately factored into the economic components of the EES.
 - f. The adequacy of proposed measures to enhance potential benefits to local and regional businesses and minimise potential adverse effects to local land-uses and businesses.
 - g. Any other matters you identify which you consider relevant within the limits of your expertise, including any limitations of the economic components of the EES.
 - h. Any appropriate qualifications or conditions that should be attached to findings or conclusions, such as uncertainties or gravity of threats or impacts.
3. As an expert you are able to consider any such material you consider relevant to your enquiry. Please identify in your report any further materials you consult outside of the briefed materials.

Expert Witness Code of Conduct

4. In preparing your Supplementary Statement, please ensure that you comply with the *Guide to Expert Evidence provided by Planning Panels Victoria* (April 2019), including by:
- a. setting out all instructions that define the scope of the statement (i.e. attach this letter of brief dated 24 February 2021); and
 - b. making the following declaration:

(2)

'I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.'

Important dates

5. To enable us to meet the Inquiry and Advisory Committee's filing deadline, we request that your Supplementary Statement be provided by noon on **Wednesday 10 March 2021**.

Confidentiality

6. This request for a Supplementary Statement, as well as any correspondence relating to this request, is for the purposes of the Fingerboards mineral sands mine project EES process, including the public hearings before the IAC. It is therefore confidential and is protected by legal professional privilege.

Fees and Terms of Engagement

[Redacted]

Please contact Virginia Trescowthick if you have any questions or require further information.

Yours faithfully

[Redacted signature]

Virginia Trescowthick
Lawyer