14th August, 2025

Submission regarding SSD-56284960 'Restart of Redbank Power Station'.

Dear Commissioners,

Please find below my submission based on my extensive experience in natural resource management.

Your sincerely

[redacted]

Dr Evan Christen (CPAg)
[redacted]

My qualifications and experience:

I have Masters and Doctoral degrees associated with Natural Resource Management, especially soil and water and 30 plus years experience in soil, water and agriculture research and management.

I am currently a Certified Practicing Agriculturalist under the auspices of *The Australian Institute of Agricultural Science and Technology (AIAST).* Recently I have also been an expert reviewer for the *Global Environment Facility (GEF)* with regard to carbon sequestration in the degraded environments.

Overall view of the proposal:

Having reviewed the proposal SSD-56284960 relating to the Redbank Power Station I find that the investigations and reports are inadequate to assess the merits of the proposal in terms of carbon accounting, soil and water impacts. The overall assessments for this proposal are partial at best and are clearly not comprehensive. Therefore, this proposal should not be supported. Detailed arguments regarding these factors are provided below.

Regarding carbon:

- the proposal does not consider the literature that shows that existing forests and woody vegetation have been shown to sustain carbon accumulation rates over extended periods, though these rates can be lower than those observed in younger, actively regrowing forests. House et al. (2023) show that older stands serve as significant carbon reservoirs due to their greater biomass and stability over time. They estimate that the carbon accumulation capacity in older forests can persist for decades, reaffirming that these systems are vital for long-term carbon storage as they reach maturity.
- Lundmark et al. (2016) indicates that practices such as clear-cutting can lead to immediate losses in soil carbon stocks, significantly affecting the overall carbon balance in the ecosystem.

- Estimates indicate that young regrowing forests/woody vegetation can sequester carbon at rates ranging between 1.1 to 4.3 metric tons per hectare per year, whereas mature forests can store upwards of 50 to 70 tons per hectare of carbon cumulatively (Steininger, 2004). While regrowing forests may achieve significant carbon offsets, they often hold a temporary advantage over older counterparts. The risk posed by climate fluctuations can lead to adverse effects, including droughts, which can reduce regrowth rates and carbon uptake (Nunes et al., 2020).
- Older, undisturbed forests tend to have established carbon pathways that may not be easily replicated in younger, regrowing forests. Mature forests significantly contribute to total carbon stocks, further confirming that conservation and sustainable management of existing forests should be prioritized over clearing (Chen et al., 2010).

The proposal does not properly consider that although regrowing forests or indeed other land uses post clearing in Australia present the potential for carbon sequestration, particularly in the short-term, they do not inherently accumulate carbon at rates surpassed by older, undisturbed forests over the long term, especially when soil carbon losses are considered. These factors together with all the other elements of the carbon cycle for the whole enterprise, over at least a 50 year time frame need to be carefully studied for this proposal before any assessment can be made as to the carbon balance and hence any possible benefits. Therefore this proposal should not be approved.

Regarding soils:

Clearing woody vegetation has significant impacts on soil quality and health. These impacts are changes in soil composition, nutrient cycling, erosion rates, and overall soil productivity:

- Immediate alterations in soil structure and nutrient dynamics with significant decreases as a result of nutrient leaching and a lack of organic matter inputs once the vegetation is removed (Thornton & Elledge, 2022). The loss of tree cover diminishes organic carbon inputs, which are critical for maintaining soil health.
- Depletion of total organic carbon (TOC) and its link to the decline in the physical and chemical properties of soils after the clearing (Rasiah et al., 2014).
- Soil erosion due to wind and water due to the removal of the the soil cover and protective canopy leads to loss of soil depth and fertility.
- Soil salinisation may occur with negative onsite and offsite impacts where deep-rooted vegetation is cleared.

The proposed clearing can thus lead to degraded soils that are less able to fulfill their ecological functions, including water retention and nutrient supply. Erosion and salinity impacts on-site soil health and have offsite impacts via sediment transport, phosphorous and salinity increases in downstream waters. There could be very large negative impacts to natural ecosystems and downstream water users. These onsite and offsite aspects and their potential catchment wide impacts have not been assessed. Therefore this proposal should not be approved.

Regarding hydrology:

The clearing of woody vegetation significantly affects both surface and groundwater hydrology, leading to alterations in water cycles, which can exacerbate issues of flooding and salinity while impacting water availability and quality:

- Increasing surface runoff due to the loss of the protective canopy and root systems that facilitate water infiltration. Deforestation results in higher run off to rainfall ratios with commensurate increased flood risks and also a reduction in base flows of surface streams (Lyra & Rigo, 2019) (Barua et al., 2021).
- Increased soil erosion, contributing to sedimentation in rivers and streams, adversely affecting aquatic habitats and water quality (Lyra & Rigo, 2019).
- Increased groundwater recharge which can lead to a rise in water tables resulting in soil waterlogging and soil salinisation. This can also result in salinisation of streamflows due to saline groundwater incursion (Dean et al., 2015).
- Changes to water retention, rainfall and evapotranspiration patterns resulting in overall catchment drying (Fan et al., 2023).

Surface and groundwater hydrology changes will result from woody vegetation clearing. These changes could be very significant and have whole of catchment effects that may compromise both ecological and agricultural systems and impact water users. This potential impacts have not been properly assessed, therefore this proposal should not be approved.

Note: The changes and potential negative impacts to carbon, soils and water resources as outlined above cannot be considered as external to this proposal, as they will be driven by this proposal. Therefore the commissioners must consider these implications in the overall impacts of this proposal.

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