Submission on proposed Restart of Redbank Power Station

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Greenhouse gas emissions

The proponent proposes to restart the Redbank power station by using up to 700,000 dry t per year of biomass as fuel. Their GHG report used an operational scenario where emissions were estimated based on a planned maximum throughput of biomass fuel of 850,000 tpa (25% moisture content).

The proponent's GHG report states that the total Scope 1 emission for the Proposal at capacity is calculated to be 21,241 t CO_2-e/year [with the combustion of biomass for electricity generation being responsible for 97% of the total]. These emissions are only counting the non-CO_2 GHGs and emissions from fossil fuels and omit the emissions from combustion of the biomass.

This omission has the effect of underestimating the Scope 1 emissions by two orders of magnitude.

The scenario used in their GHG report involved the operation of Redbank with no measures to avoid or reduce GHG emissions. Scope 1 emissions were calculated for fuel combustion (for electricity generation) using the biomass fuel counting only emissions of methane and nitrous oxides, and for on-site diesel consumption associated with biomass handling and Proposal start-up. Scope 3 emissions were calculated for fuel combustion associated with biomass processing and transport to Redbank, as well as for on-site diesel use.

The actual emissions from burning 850,000 tpa at 25% moisture content would be around 1,169,813 t CO_2. This is calculated as follows:

- 850,000 tpa at 25% moisture is 637,500 t dry biomass
- Around half of dry biomass is carbon, giving 318,750 t C
- 318,750 t C is multiplied by 3.67 to get CO_2 equivalent.

How can there be two orders of magnitude difference between the proponents GHG report and the actual CO_2 emissions? The explanation is that their analysis is based on the assumption that burning woody biomass for energy is carbon neutral. A model built on this assumption therefore is designed not to see or represent the powerplant's CO_2 emissions. Rather, the emissions are ignored and not reported

We addressed this issue in a peer reviewed scientific paper by Mackey et al (2025) published recently in the British Royal Meteorological Society journal called Climate Resilience and Sustainability. The paper can be accessed here: https://rmets.onlinelibrary.wiley.com/doi/full/10.1002/cli2.70015. Assuming the emissions up the stack from burning woody biomass are carbon neutral is a scientifically false assumption which unfortunately is all too commonly used in models to support the claim that burning woody biomass as a feedstock for generating bioenergy is climate neutral and the CO_2 emissions up the stack can be ignored.

While the emissions from burning biomass are instantaneous, their net removals from the atmosphere by regrowth are not. This means there is a significant time lag between when carbon is emitted and when an equivalent amount could be removed and stored. This theoretical removal of atmospheric carbon through regrowth can take decades to centuries and if the intention is for the land clearing to be ongoing, there will always be more carbon in the atmosphere than in the ecosystem if it were left to continue maturing. The lag between emissions and removals (if they ever occur) is critical because deep and sustained emission reductions are needed now to limit global warming to the 1.5°C Paris Agreement target. Delaying carbon removal until beyond 2030-2050 is not a climate solution.

Further details on scientific concepts about carbon accounting for the use of woody biomass for energy.

This section draws upon research findings published in Keith et al. 2022 and The Land Gap Report.

Burning biomass will always result in emissions of CO_2 into the atmosphere and these must be counted as part of Australia's emissions reduction targets.

The assumption made in the Redbank proposal that emissions of CO_2 from burning biomass have an emissions factor of zero is false. These emissions were not included in the accounting because they are supposedly balanced by uptake of CO2 by the biomass during its lifetime.

In fact, as detailed above, the emissions from combustion of the biomass would be well over 1 million tonnes of CO_2 per year. Plus, there are foregone removals due to clearing the native vegetation. These emissions must be accounted for; it is not clean energy.

The reasons relate to both the spatial and temporal context of the emissions.

First is the spatial context.

1. If the land is being cleared for grazing, then the removal of trees is a permanent loss of the carbon stock and there is no subsequent uptake of CO_2.

2. If the biomass supply is considered as invasive species that would be cleared anyway, then there is still a carbon stock deficit compared with the original natural woody vegetation. The reference level for comparison should be the original vegetation, not no vegetation.

3. If there is regrowth of the woody vegetation, then there will be slow carbon uptake over many decades. However, at a landscape scale where areas are cleared and regrow, there will always be a lower average carbon stock and therefore a deficit that must be accounted for.

4. The proposal that biomass could be harvested to provide a sustainable yield and that this is the reason stated to justify the assumption of carbon neutrality is false. In terms of an annual yield, it is feasible to maintain an ongoing yield (if there was sufficient land). However, the reference level for comparison of the effects of the proposed project should be the biomass stock of the original vegetation with no harvesting. In the same manner as #3, at a landscape scale where there is ongoing harvesting each year of some areas and subsequent regrowth, there will always be a lower average biomass stock and therefore a deficit. A sustainable yield is not the same as a neutral effect on the carbon balance, and it is not "sustainable" in terms of the climate impact. Applying the correct reference level and analysis of the impacts of the proposed project compared with the counterfactual of no project, is critical.

Second is the temporal context.

1. The timing of emissions and removals is critical. The total emissions from burning woody biomass occur instantaneously. In contrast, the removals from slow regrowth take a long time. This time lag is critical because the world needs to reach peak atmospheric CO_2 concentration and reduce emissions now and not wait for removals that may occur decades into the future. Relying on carbon removals in the future is only exacerbating the climate problem for the next generation.

2. If the biomass supply is considered as waste that would have decomposed in the counterfactual, then these decomposition emissions would have occurred over a longer time period than direct combustion.

The stated GHG emissions for the Redbank proposal are 21,000 t CO_2/yr but this only includes non- CO_2 GHGs and emissions from use of fossil fuels. It does not count any of the emissions from biomass combustion.

The true climate impact of the proposed power station should be assessed by the GHG accounts for the whole system of the power station energy generation and its demand for biomass supply, compared with the existing state of the biomass stock in the current vegetation.

The emissions from biomass removal and combustion need to be accounted, in either the energy sector or land sector, but it is not carbon neutral.

If the emissions are counted as a carbon stock loss in the land sector, which is according to the UNFCCC convention for national GHG inventory reporting, then this still needs to be included in the GHG accounts for the power station operation as a whole. This omission of the emissions from biomass

combustion founded on the false assumption that biomass supply is “sustainable” is a serious error in the GHG inventory report for the proposed project.

Problems with the proposed source of woody biomass

1. Clearing of native vegetation is harmful for biodiversity, soil health, water resources and many other ecosystem services.

2. Creating a demand for a large source of biomass will incentivise further clearing, which is in contrast to the fact that it should be reduced for multiple environmental reasons.

3. The carbon loss from land clearing should be included in the GHG inventories for the value chain of all agricultural products from the private land, reported by the purchasing companies’ Scope 3 emissions.

4. Growing biofuel crops is problematic because it is taking agricultural land away from food production, stated as 60,000 ha.

Use of short rotation crops

The use of short rotation crops is proposed in the future to replace woody biomass as the feedstock for bioenergy. However, to reduce atmospheric CO_2 concentrations it would have to be the case that the cumulative emissions are lower than all alternative courses of action that would have happened to the biomass in the absence of burning for energy (Becken et al. 2023). The reference level for comparison of emissions reduction benefits should be the natural vegetation of the land, which was originally cleared causing emissions, and could be restored to increase removals. In addition, the use of land to produce feedstock for bioenergy has serious consequences for agricultural production, as shown in The Land Gap Report. There are other sources of renewable, non-carbonaceous energy that do not require using vast tracts of land.

In summary

Burning biomass is not carbon neutral and should not be considered as a clean renewable energy source. It is harmful to the climate and harmful to the environment from where the trees are cleared. Use of bioenergy should not be considered in any energy strategy aimed at achieving net zero emissions.

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