Submission on the Environmental Impacts of Bullawah Wind Farm

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1. Introduction

The Bullawah Wind Farm project, consisting of 143 wind turbines with a tip height of 300 meters and a 2.5 GW battery storage system (359 MW/2 hours), is one of the most important renewable energy investments in Australia, valued at $2.5 billion. Although such projects are important for transitioning to clean energy and reducing carbon emissions, they also bring substantial environmental challenges. This submission critically examines the environmental impacts of the Bullawah Wind Farm, with a focus on habitat fragmentation, incorrect carbon accounting, biodiversity loss, temperature changes, and legal compliance.

2. Habitat Destruction and Fragmentation

The development of the Bullawah Wind Farm will require clearing large areas of land, which will result in habitat fragmentation and destruction. This impact is particularly severe for species like the koala (*Phascolarctos cinereus*) and the greater glider (*Petauroides volans*), both of which rely on uninterrupted eucalyptus forests for survival (Zhang et al. 2020, p. 640). The project's footprint will include significant deforestation, contributing to both direct habitat loss and the isolation of wildlife populations, which weakens genetic diversity and heightens the species' vulnerability to environmental changes and diseases.

Case Study: Lotus Creek Wind Farm, Queensland

The **Lotus Creek Wind Farm** in Queensland illustrates the risks of habitat destruction and carbon mismanagement in renewable energy projects. Similar to Bullawah, this project requiring the clearing of forests, resulting in habitat fragmentation and the release of large amounts of stored carbon, contradicting the project's aim to mitigate climate change (Rainforest Reserves Australia 2024). The impact on local fauna, including koalas, further underscores the need for comprehensive environmental planning and accurate carbon accounting (Crowther et al. 2022, p. 166).

Koalas exhibit strong site fidelity, meaning they are highly attached to their established home ranges. When these areas are cleared, koalas face increased stress, malnutrition, and potentially mortality due to the difficulty of relocation (Koala Management Guidelines 2023, p. 45). The greater glider, which depends on mature eucalyptus trees with hollows for nesting, faces a similar threat. As forests are cleared, the availability of suitable nesting sites declines, severely impacting the species' ability to thrive (Department of Climate Change, Energy, Environment, and Water 2023, p. 60).

3. Impact on Flora and Fauna

The Bullawah Wind Farm is situated in a region rich in biodiversity, with key flora such as *Eucalyptus tereticornis* (Forest Red Gum) and *Acacia implexa* (Lightwood). These plants are vital for carbon sequestration and serve as the foundation of the local ecosystem (Zhang et al. 2020, p. 640). The clearing of such vegetation not only disrupts these processes but also contributes to the release of stored carbon into the atmosphere, aggravating the problem of global warming.

In addition to flora, various fauna species, including the Superb Parrot (*Polytelis swainsonii*), Eastern Grey Kangaroo (*Macropus giganteus*), and Eastern Blue-tongue Lizard (*Tiliqua scincoides*), rely on this habitat. The koala, a species already listed as vulnerable, is particularly susceptible to habitat loss caused by wind farm development. Studies show that wind farms lead to habitat fragmentation, impacting koalas' access to food sources and increasing mortality (Crowther et al. 2022, p. 166). This highlights the contradiction between the project's aim to mitigate climate change and its role in endangering local species.

4. The Heat Island Effect and Thermal Belts
Large-scale wind farms, like Bullawah, are increasingly being recognized for their contribution to localized warming, commonly referred to as the heat island effect. This phenomenon occurs as wind turbines alter airflow and surface energy balance, leading to an increase in local temperatures. Research suggests that these localized heat increases can be as high as 4°C (Barron-Gafford et al. 2016, p. 8), a significant rise that disrupts local ecosystems and affects species that rely on cooler microclimates.

Case Study: Three Gorges Dam, China
While the **Three Gorges Dam** is a hydropower project, it demonstrates the significant unintended climatic impacts of large-scale energy infrastructure. The project resulted in local temperature increases, altered microclimates, and disrupted biodiversity (Rainforest Reserves Australia 2024). These effects closely mirror the heat island phenomenon anticipated at the Bullawah Wind Farm, where localized warming could stress species sensitive to temperature changes, like the koala, and disrupt plant communities by altering soil moisture and hydrological cycles (Zhang et al. 2020, p. 645).

Koalas are particularly vulnerable to temperature changes. Even slight temperature increases of 2-3°C can drastically reduce their survival rates, as they rely on cool, shaded environments to regulate their body temperature (Crowther et al. 2022, p. 166). The heat island effect also alters soil moisture and affects plant growth, which in turn impacts the availability of food for herbivores like the koala and the Eastern Grey Kangaroo.

5. Noise and Vibration Pollution
Wind turbines are known to produce low-frequency noise and vibrations, which can have profound impacts on both wildlife and vegetation. Koalas, for example, use low-frequency vocalizations for mating and territorial behavior. The introduction of noise from turbines could interfere with these communications, leading to reduced reproductive success and increased stress (Smith & Johnson 2023, p. 210).

Case Study: Junction Rivers Wind Farm, New South Wales
The **Junction Rivers Wind Farm** encountered similar issues with noise pollution affecting wildlife communication. The koala population in the region experienced disruptions in their breeding patterns due to noise interference, and the greater glider population suffered from reduced access to nesting sites due to tree root damage caused by vibrations (Department of Climate Change, Energy, Environment, and Water 2023, p. 60). These findings underscore the importance of considering both noise and vibration pollution in the environmental assessment of wind farms like Bullawah.

The vibration produced by turbines also poses a significant risk to plant health, particularly for mature eucalyptus trees that form the backbone of the local ecosystem. Prolonged exposure to vibrations can damage root systems, weakening trees and making them more

susceptible to disease and other stressors. For arboreal species like the greater glider, this decline in tree health could result in a reduced food supply and fewer nesting sites, compounding the impacts of deforestation (Rainforest Reserves Australia 2024, p. 4).

6. Carbon Mismanagement and Lifecycle Emissions
While renewable energy projects like the Bullawah Wind Farm aim to reduce carbon emissions, the reality of lifecycle emissions are underreported. The construction of wind turbines requires substantial amounts of steel, concrete, and other carbon-intensive materials. Moreover, the clearing of forests to make way for wind farm infrastructure releases significant amounts of stored carbon into the atmosphere, undermining the project's goal of reducing overall emissions (Li et al. 2018, p. 392).

Case Study: Lotus Creek Wind Farm, Queensland
As seen in the **Lotus Creek Wind Farm**, clearing vegetation for wind farm infrastructure will lead to significant releases of stored carbon, raising the project's overall carbon footprint. Similar to Bullawah, the failure to account for lifecycle emissions, such as those from construction and decommissioning, risks perpetuating carbon mismanagement (Heath & Mann 2012, p. 3436).

Australia's carbon accounting models, such as FullCAM, do not fully account for the emissions related to the construction, transportation, and decommissioning phases of renewable energy projects. This oversight can result in lifecycle emissions being up to 10% or higher than reported (Heath & Mann 2012, p. 3436). By ignoring these indirect emissions, the Bullawah Wind Farm risks perpetuating carbon mismanagement similar to other projects, such as the Lotus Creek Wind Farm.

7. Socio-Economic Implications of Land Use Conflicts
Renewable energy projects often create conflicts between land use for energy production and traditional agricultural or residential purposes. The extensive land clearing required for the Bullawah Wind Farm is expected to impact local water availability, further exacerbating socio-economic tensions. Farmers may face higher irrigation costs and reduced agricultural productivity as a result of altered hydrological cycles and soil conditions (Zhang et al. 2020, p. 644).

Case Study: Yackandandah Microgrid, Victoria
The **Yackandandah Microgrid** project in Victoria demonstrates how even smaller-scale renewable energy projects can create land-use conflicts. This project highlighted the need for comprehensive environmental planning and local community engagement to minimize ecological impacts (Indigo Power 2023). The socio-economic challenges faced by the Bullawah Wind Farm will likely mirror these, on a larger scale.

8. Legal Breaches and Non-Compliance
The Bullawah Wind Farm is subject to several key pieces of environmental legislation, including the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) and NSW's Biodiversity Conservation Act 2016. These laws require that any project likely to affect nationally listed species or ecosystems must undergo a thorough environmental impact assessment (Commonwealth of Australia 1999; NSW Government 2023).

Case Study: Junction Rivers Wind Farm, New South Wales
The **Junction Rivers Wind Farm** also encountered legal challenges regarding compliance with the **EPBC Act**. The project's inability to mitigate habitat destruction and noise pollution resulted in delays and financial penalties (Department of Climate Change, Energy, Environment, and Water 2023). Similarly, the Bullawah Wind Farm risks legal breaches if appropriate mitigation strategies are not implemented to protect vulnerable species like the koala and greater glider.

Failure to adequately mitigate the impacts of habitat destruction, noise pollution, and carbon mismanagement could result in breaches of these regulations, leading to significant legal penalties and project delays. In addition to legal consequences, non-compliance could result in long-term ecological damage, further exacerbating the environmental challenges the Bullawah Wind Farm is intended to address.

9. Conclusion: Rethinking Renewable Energy's Environmental Impact
The Bullawah Wind Farm represents an opportunity for Australia's renewable energy transition. However, the significant environmental costs associated with the project—including habitat destruction, biodiversity loss, heat island effects, and incorrect carbon accounting—cannot be ignored. The project risks undermining its climate mitigation goals through unsustainable practices that contribute to habitat degradation and species endangerment.

As we move forward in the global effort to combat climate change, we must balance renewable energy innovation with the preservation of our natural world. Projects like Bullawah Wind Farm offer potential, but only if they are implemented sustainably. True progress lies in our ability to embrace energy solutions that protect our biodiversity, maintain ecological integrity, and engage with local communities in meaningful ways. It is not enough to merely reduce emissions; we must ensure that our actions today safeguard the environment for future generations. With careful planning, accountability, and a commitment to environmental stewardship, we can build a future where renewable energy supports both a sustainable climate and the vibrant ecosystems that are the lifeblood of our planet.

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