Submission to the New South Wales Department of Planning and Environment

Re: Environmental Impact of the Baldon Wind Farm Project, Hay
Date: 10 September 2024
Submitted to: https://www.planningportal.nsw.gov.au/major-projects/projects/baldon-wind-farm
Author: Dr Anne Suse Smith, Rainforest Reserves Australia
Project: Baldon Wind Farm Development
Location: Near Hay, NSW, Australia

Introduction

This submission, authored by Dr Anne Suse Smith, Rainforest Reserves Australia, addresses the significant environmental impact concerns related to the proposed Baldon Wind Farm Development near Hay, New South Wales (NSW). The proposed project involves the construction and operation of 180 wind turbines with a total capacity of 1 gigawatt (GW), alongside an energy storage battery facility. While the project aims to enhance NSW's renewable energy capacity, it poses considerable risks to local flora and fauna, including habitat destruction, noise pollution, increased ground temperatures, vibrations, and other disturbances. This document provides a comprehensive analysis of these potential impacts, incorporates relevant case studies to illustrate similar situations, evaluates the effectiveness of the proposed mitigation measures, and advocates for more robust environmental safeguards.

Scope and Size of the Baldon Wind Farm Project

1. Project Overview and Infrastructure Details

The Baldon Wind Farm Development is a large-scale renewable energy project designed to boost NSW's renewable energy output and contribute to the state's transition to a low-carbon economy. The project comprises several key components:

- **Number of Turbines:** The project includes the installation of 180 wind turbines, each with a height of approximately 220 meters to the tip of the blade. These turbines are expected to generate a total capacity of up to 1 gigawatt (GW), sufficient to power approximately 500,000 homes annually.
- **Battery Storage Facility:** The project also includes a large-scale battery storage system to store excess energy generated by the wind farm and release it during peak demand periods, enhancing grid stability and efficiency.
- **Transmission Infrastructure:** New high-voltage transmission lines will be constructed to connect the wind farm and battery storage facility to the state electricity grid. This will require clearing wide corridors through existing vegetation and may impact several ecological communities.
- **Access Roads and Ancillary Facilities:** To facilitate the transportation of turbine components, maintenance equipment, and site personnel, approximately 100 kilometers of new access roads will be constructed. Additional infrastructure will include substations, control buildings, and temporary construction camps.
- **Land Area Utilization:** The total project area spans approximately 15,000 hectares. This area will be significantly altered to accommodate turbine foundations, access roads, transmission corridors, and other infrastructure, resulting in substantial land use changes and habitat modification.

2. Location and Environmental Context

The project is situated near Hay, a rural town in the Riverina region of southwestern NSW. The landscape is characterized by open plains, scattered woodlands, and watercourses, which are crucial for local biodiversity. The project site encompasses several key ecological communities, including:

- **Semi-Arid Woodland:** This ecosystem, primarily composed of species like *Eucalyptus largiflorens* (Black Box) and *Casuarina cristata* (Belah), supports a range of native flora and fauna. Many of these species are adapted to the semi-arid conditions of the region and are particularly sensitive to habitat disruption.
- **Riparian Habitats:** Watercourses such as the Murrumbidgee River and its tributaries provide essential habitats for aquatic and semi-aquatic species, playing a critical role in maintaining regional hydrology and biodiversity.

3. Potential Environmental Impacts

Impact on Flora and Vegetation:

- **Habitat Destruction:** The construction of turbines, transmission lines, and access roads will require extensive land clearing, leading to the loss of native vegetation, including semi-arid woodland communities. This clearing disrupts ecosystems that provide habitat for various species, including threatened plants such as *Swainsona sericea* (Silky Swainson-pea) and *Atriplex nummularia* (Old Man Saltbush).
- **Fragmentation of Habitats:** The project will fragment existing habitats, creating isolated patches of vegetation that can limit species movement and reduce genetic diversity. This fragmentation particularly affects species with limited dispersal abilities, such as *Acacia loderi* (Nealie), increasing their vulnerability to extinction.

Impact on Fauna and Wildlife:

- **Noise Pollution:** The operation of wind turbines generates continuous noise, particularly low-frequency noise, which can disturb local fauna. For example, the *Macropus robustus* (Wallaroo) and *Nyctophilus geoffroyi* (Lesser Long-eared Bat) may experience stress and altered behaviors due to noise interference with their natural communication and mating calls. Similar impacts were observed at the Gullen Range Wind Farm (NSW), where significant noise pollution from low-frequency sounds and infrasound affected species such as the Eastern Grey Kangaroo (*Macropus giganteus*) and local bird populations (Thorne et al., 2017, p. 84) Link.
- **Increased Ground Temperature:** The infrastructure can lead to localized warming or the "heat island effect," adversely impacting temperature-sensitive species such as *Varanus rosenbergi* (Rosenberg's Goanna) and *Chelodina expansa* (Broad-shelled Turtle). Research on microclimatic changes induced by wind farms has found that this warming can negatively impact species adapted to cooler conditions, leading to heat stress, dehydration, and higher mortality rates (Armstrong et al., 2020, p. 115) Link.
- **Vibrations and Subterranean Disturbance:** Construction activities, such as piling and drilling, create ground vibrations that can affect burrowing species like *Lasiorhinus latifrons* (Southern Hairy-nosed Wombat) and small mammals. Vibrations may cause these animals to abandon their burrows, leading to increased predation and mortality.
- **Avian Collisions:** The turbines pose a collision risk to birds, particularly raptors like the *Aquila audax* (Wedge-tailed Eagle) and migratory species such as the *Epthianura albifrons* (White-fronted Chat). A case study from the Capital Wind Farm (NSW)

estimated an average of 10 bird fatalities per turbine per year, which poses a significant threat to local bird populations (Hull et al., 2015, p. 97) Link.

- **Hydrological Impacts:** The construction and operation of the Baldon Wind Farm are likely to cause significant hydrological changes, including increased sedimentation in nearby water bodies due to land clearing and altered drainage patterns. Similar hydrological impacts were observed in the Sapphire Wind Farm case study (New England Region, NSW), where land clearing for infrastructure development led to increased sedimentation, adversely affecting aquatic species such as the Eastern Freshwater Cod (*Maccullochella ikei*) (Lee et al., 2019, p. 43) Link.

4. Proposed Mitigation Measures and Their Limitations

The project developers have proposed several mitigation measures to reduce the environmental impact. However, these measures have significant limitations and often fail to address the full scope of potential impacts.

Proposed Mitigation Measures:

1. **Vegetation Offsets:** The developers propose offsetting cleared vegetation by protecting equivalent areas elsewhere. While offsets are a common mitigation strategy, they often fail to replicate the ecological functions of the original habitats. Research indicates that offsets do not always support the same species diversity or ecological processes as the impacted areas, leading to net biodiversity loss (Bull et al., 2013, p. 201) Link.
2. **Noise and Vibration Controls:** Proposed measures include limiting construction hours and using noise barriers. However, these strategies may be inadequate for protecting nocturnal species, such as the Lesser Long-eared Bat, which are active at night and particularly sensitive to noise and vibrations.
3. **Wildlife Corridors:** The plan includes the creation of wildlife corridors to facilitate animal movement across fragmented landscapes. However, the effectiveness of these corridors is often compromised by edge effects, human activity, and insufficient width, which limit their utility for many species, particularly those with larger home ranges or specialized habitat needs (Drielsma et al., 2017, p. 150) Link.
4. **Bird and Bat Deterrents:** The project suggests using bird and bat deterrents, such as ultraviolet lighting or acoustic devices. However, studies have shown that these deterrents are not consistently effective across different species and do not eliminate the risk of collision for birds and bats (May et al., 2020, p. 78) Link.

Critical Analysis of Mitigation Measures:

- **Vegetation Offsets:** Offsetting is criticized for failing to provide comparable habitats for species dependent on specific ecological communities. For example, semi-arid woodlands have complex ecological dynamics that are not easily replicated, making it impossible to effectively replace with offsetting.
- **Noise and Vibration Controls:** These measures are inadequate for mitigating chronic noise and vibration exposure, which can lead to long-term behavioral and physiological changes in wildlife. Nocturnal species and those with heightened auditory sensitivities, like the Lesser Long-eared Bat, remain at significant risk.
- **Wildlife Corridors:** While corridors aim to connect fragmented habitats, they often fail due to inadequate design and management. Corridors might not be sufficient to support species with larger habitat requirements, and their effectiveness can be limited by external factors like human encroachment and habitat degradation along the corridor edges.

- **Bird and Bat Deterrents:** These deterrents have shown limited effectiveness, especially during adverse weather conditions or night flights, when many species are most active. The failure to fully mitigate collision risks poses a significant threat to avian and chiropteran (bat) populations.

Case Studies and Research Included in the Submission

Gullen Range Wind Farm Case Study (NSW)
- **Topic:** Noise and Vibration Impacts
- **Details:** Research on the Gullen Range Wind Farm near Crookwell, NSW, demonstrated significant noise pollution, particularly from low-frequency sounds and infrasound, which affected both local human populations and wildlife. Behavioral changes were observed in species such as the Eastern Grey Kangaroo (*Macropus giganteus*) and local bird populations.
- **Reference:** Thorne et al. (2017) Link.

Capital Wind Farm Case Study (NSW)
- **Topic:** Impact on Avian Species
- **Details:** The study on the Capital Wind Farm near Bungendore, NSW, found that turbine collisions posed significant risks to bird species, including the Wedge-tailed Eagle (*Aquila audax*) and the Superb Parrot (*Polytelis swainsonii*). The case study estimated an average of 10 bird fatalities per turbine per year, highlighting the threat to local bird populations.
- **Reference:** Hull et al. (2015) Link.

Sapphire Wind Farm Case Study (New England Region, NSW)
- **Topic:** Hydrological Impacts
- **Details:** This study highlighted hydrological changes resulting from large-scale land clearing for wind farm development, which led to increased sedimentation in water bodies. This affected aquatic species such as the Eastern Freshwater Cod (*Maccullochella ikei*), which relies on clean, sediment-free streams for breeding.
- **Reference:** Lee et al. (2019) Link.

Research on Microclimatic Changes Induced by Wind Farms
- **Topic:** Ground Temperature Increases (Heat Island Effect)
- **Details:** Research focused on the microclimatic changes caused by wind farms, particularly the localized warming or "heat island effect" around turbine sites. This warming can negatively impact temperature-sensitive species such as the Common Dunnart (*Sminthopsis murina*).
- **Reference:** Armstrong et al. (2020) Link.

Analysis and Application of Case Studies
These case studies provide empirical evidence of the types of impacts observed in similar wind farm projects. They are used to illustrate the likely consequences of the Baldon Wind Farm project on local flora and fauna, given the similarity in scale and environmental context. The inclusion of these case studies enhances the submission by providing real-world examples that demonstrate the inadequacies of proposed mitigation measures and the need for more comprehensive environmental protections.

5. Conclusion and Recommendations

Given the scope and scale of the Baldon Wind Farm project, the proposed mitigation measures are insufficient to address the full range of environmental impacts on local flora and fauna. There is a pressing need for more comprehensive environmental assessments and the development of more robust, scientifically-backed mitigation strategies to minimize biodiversity loss and habitat degradation. The NSW Department of Planning and Environment should mandate a revised environmental impact assessment (EIA) that includes these considerations and promotes the adoption of more effective conservation practices.

References

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