

Submission to the Hills of Gold wind farm

This submission will continue on the theme of bushfires and should be read in conjunction with my bushfire submission made during the first exhibition period (number 13628189 from my DPE account or 13628195 from the Submissions Register)

As I didn't qualify due to the arbitrary decision to only respond to individual submissions from those within 5km of the project, I'm not sure whether the DPE planners will take the original submission into account for their merit assessment or whether the IPC will do likewise during their Recommendation process. Let's hope the Act is followed.

From my reading of the November 2022 Amendments, most of the bushfire emphasis is on the:

- Bushfire Emergency Management and Operations Plan,
- Asset Protection Zones, and
- Flame Lengths.

Each of these gets multiple references throughout the main report and Appendices.

As I read it, the water supply is still anything but guaranteed and surrounding landowners will be reassured that there will be water and equipment on the ridge for the exclusive use of the proponent.

The extended gap between turbines may be of some benefit to the helicopters, but from my observations the "heavy" tankers do a straight run from any point of the compass and most likely not near any turbines.

I'm assuming that if there was anything stunning on bushfires in the first RTS and Amendment report, ERM would have repeated it.

There are of course other submissions during the first exhibition period on the subject of bushfires.

One submission that appealed was from a Mr Brian Tomalin (the submission number in the URL is 13700324)

The bushfire section from his submission is attached. Mr Tomalin seems to know what he is talking about. It is not clear whether Mr Tomalin's submission was excluded from a detailed response under the 5 km rule.

All bushfire mitigation mentioned above relates mainly to bushfire impacts on the proponents assets which most of us aren't particularly troubled about. Neither is DPE. The bushfire section of the SEARs is more concerned with potential impacts to the surrounding properties. So of course are the residents of Hanging Rock, Crawney and beyond. There is little to convince the surrounding property owners that they will not be more exposed to the impact of bushfires should this wind farm be built. The proponent has had many opportunities to address bushfire impacts on surrounding properties but hasn't.

Clearly, the presence of a wind farm will impact the existing community in the event of a fire, whether it was caused by the wind farm, started within the wind farm, or started elsewhere and was threatening the wind farm. There is a limited amount of fire fighting resource, both equipment and personnel. Engie will expect, as their EIS implies that the wind farm gets its fair share and more. That assumes there is not a fire front or another fire threatening Nundle.

If there is a choice to be made whether the Hanging Rock RFS Captain defends the assets of a multi-national or his own community, why should he make a different decision to what he would make today.

I and others have made the case that a wind farm on the ridge will increase the likelihood of more severe bushfires in one or more of the 25-50 longer, hotter, drier, windier bushfire seasons. Given the recent fire history, the relative inaccessibility of the wind farm, the bushfire friendly terrain, zoning and climate change, we start from a very bad position today.

The proponent has not addressed the relevant SEARs, and for that reason alone the application should be rejected.

APPENDIX J BUSHFIRE ASSESSMENT

Bushfire Risk

The bushfire assessment is inadequate for a project such as the Hills of Gold Wind Farm. Much of the information is generic in nature with virtually no site-specific data. This is not surprising as a planned site visit by the plan author did not eventuate.

The unique nature of the Project Area and surrounds cannot be assessed without on-ground site assessment, comprehensive study and understanding of the variations within the area. Fire behaviour and management are influenced by altitude and slope. The high ridge contains sub alpine vegetation which requires hot fire (not wildfire) at long intervals to maintain ecological integrity. However, the vegetation types, fire behaviour and management regime changes rapidly as altitude falls. The change occurs within a decent of 30 metres. Much of the sub alpine vegetation in the Development Footprint has been removed since 2014.

The bushfire history mapping is inaccurate. A major fire in 2009 which occurred mostly in the Project Area is not recorded, a significant fire in 1994 bordering the Project Area is not recorded and the full extent of the Pages Creek fire is not shown.

There is a contradiction regarding the availability of the “Nycooma” dam for aerial firefighting.

The temperature and wind data from Tamworth Airport and Quirindi Post Office are not particularly relevant to the Project Area. The rainfall data from Nundle Post Office and “Head of Peel” is up to 50% lower than rainfall in the Project Area.

The proponent must be required to reassess the bushfire issues with on-ground investigation and more accurate information. See detailed comments on sections of Appendix J below.

Table 2.2 Summary of Key Consultation

Page 10

NPWS:

Ridge line above steep country north, south, west. Important for Pages Creek Fire control. Dam on “Nycooma” vital water source. Important that it is maintained. Important to minimise helicopter lift. Helicopters require obstacle free approach and departure.

Proponent Response

- • Ensure that Project does not reduce or restrict access along this ridgeline.
- • Increase water supply along ridgeline for both vehicle and aerial firefighting.
- • “Nycooma” dam may not be available.

Comment

The location of turbines along the ridge line will preclude the safe operation of helicopters extracting water from dams along the ridgeline. A turbine (WP21 and the Battery (BESS) will restrict access to the “Nycooma” dam. The space of turbines along the ridgeline will be a limiting factor for aerial firefighting.

The best location for helipad, staging area and refuge area is restricted for helicopter access by turbines WP54, WP55, WP56, WP57.

Page 11

Brian Tomalin:

Hanging Rock Village is particularly vulnerable to fires due to limited escape options and limited fire trails to defend the village.

Proponent Response

Site access points will be constructed as the first stage of development and the final design of access roads will enable safe access and egress for residents attempting to leave the area at the same time that emergency service personnel are arriving to undertake firefighting operations.

Comment

Outside the Project Area there are limited options for containment lines and fire trails. The nature of the terrain and vegetation can result in the closure of access roads, particularly for the evacuation Hanging Rock Village, which also limits the ability of emergency crews to gain access to the top of the mountain if a fire is approaching from the south or west.

Brian Tomalin:

Opportunities to do hazard reduction burning are being significantly reduced and Indigenous land use practices should be explored.

Comment

A misrepresentation of what was said. Indigenous management created the ecosystems we are dealing with; however, vegetation or ecosystem management needs to be adapted to today's conditions. Sympathetic small scale burning should be the basis of the management strategy. However, the area in question requires differing strategies depending on altitude and aspect. The project area and surrounding landscape contains sub alpine vegetation, cool temperate rainforest dry sclerophyll forest, native and introduced grassland with variations in altitude, temperature and rainfall. All these factors dictate the need for a range of specific vegetation and fire mitigation strategies. A descent of as little as 30 metres in altitude required a different vegetation and fire management regime.

Table 3.1 Identification of Assets

Page 17

Biodiversity

A Biodiversity Development Assessment Report (BDAR) has been prepared by Arup Pty Ltd (Arup 2020) and confirms that the Project Area has a long history of agricultural use, specifically cattle and sheep grazing.

Comment

The properties within the project area have a history of sheep and cattle grazing. The majority of the area from WP1 to WP22 excluding WP21; WP39 to WP42; WP46, to WP58 was not cleared for grazing prior to 2014. (Appendix 1)

Threatened flora

Comment

Fragrant Pepperbush (*Tasmannia glaucifolia*) is not identified. A stand of Fragrant Pepperbush was bulldozed to provide access road to Project Area. (31.333°S 151.094°E)

3.2 Climate and Fire Weather

Pages 22 to 25

3.2 Climate and Fire Weather

3.3 Climate Change and Bushfires

Comment

The temperature and humidity data provided for Quirindi Post Office and Tamworth Airport is not applicable to the Project Area and does nothing more than confirm that temperatures in summer are hotter than in winter.

The temperature in the project area is between 10°C to 15°C cooler than Tamworth or Quirindi, both summer and winter.

High rainfall in the project also induces higher humidity than both Quirindi and Tamworth. The rainfall data used for the EIS is taken from Nundle Post Office and the BOM gauge at "Head of Peel".

The rainfall records from my property adjoining Ben Halls Gap Nature Reserve from 1981 to 2014 average 1109mm pa. These records are at 850m. (Appendix 2). Landholder records for 132 Morrisons Gap Road (31.305°S 151.113°E) indicate an average of 1266mm 1.5km north of the Project Area. (Appendix 3).

My experience in the area as well as working on "Nycooma" indicate that the annual average in most of the Project Area is in the vicinity of 1500mm.

The result of high rainfall, higher humidity and lower temperature is that fire conditions are considerably different to the surrounding areas at lower altitudes.

The wind direction data recorded at Quirindi does give a general indication of the wind direction in the Project Area. However, the wind speed over the ridge where the project is proposed is often much stronger and the topography induces high turbulence as the wind passes over the steep escarpments either side of the project area.

These factors including the high altitude (1200m to 1400m), the sub alpine vegetation, long fire intervals resulting in high fuel loads, require a site-specific assessment to adequately assess the bushfire risk in the project area. A generic bushfire assessment is not an adequate approach.

3.4 Vegetation Hazard

Table 3.2 Description and Characteristics of Fuel Groups within the Project Area

Pages 26-31

Comment

The fuel groups and characteristics while based on Keith are generic and not site specific to the project area. Ground truthing is required to accurately assess the vegetation types, associations, and characteristics specific to the project

area and particularly Ben Halls Gap Nature Reserve and Crawney Pass National Park. This will give a better understanding of the unique vegetation types and associations which occur within the region.

3.5 Topography

Page 32

Recent research has shown that dynamic fire behaviour can occur on steep slopes of over 24-26 degrees. Areas downwind of these slopes can be exposed to a much greater risk of damage than normal, due to the occurrence of dynamic fire propagation and the development of catastrophic "firestorms". In the case of eruptive fire behaviour, the spread will be dominated by convective heat transfer (by strong air movement) rather than radiant heat transfer alone. In addition, eruptive fires may produce a larger area of active flame than the standard fire front, which makes containment of a bushfire more difficult.

Comment

Firestorms are not the only threat of erratic fire behaviour to the project and surrounding area. The topography of the surrounding area with steep slopes below the escarpments with either grass or timber cover are conducive generating ember showers. As a fire runs up the slopes with the intensity fuelled by wind and slope a smoke column is generated carrying hot, burning embers. As the fire front crests the summit and starts down the other side of the slope the smoke column will lose energy and collapse allowing the wind to carry the embers a considerable distance. A fire some distance from the project area at a lower altitude can ignite spot fires on the Project Area and a considerable distance on the opposite side.

The village of Hanging Rock is particularly vulnerable to the effect of an ember shower from the south and west. A fire originating near the northern end of the project area could pose a significant threat if early aerial attack it is hindered by the presence of wind turbines. Response times for ground crews to the location is constrained by distance, topography and availability.

5.1 Fire history within the Project Area

Page 36-37

Table 5.1 and Figure 5.1

Comment

There are inaccuracies in the information provided in both Table 5.1 and Figure 5.1

Not all fires impacting on the Project Area are recorded.

Pages Creek Fire burnt to Morrisons Gap Road through the 2019 hazard reduction.

Fires directly impacting the Project Area not included:

- Caves and Caves North – 08/12/2009 to 18/12/2009 (Sergeants Gap Road in south to Kirks Road in north) (Appendix 3)

Fires bordering the Project Area to the east

- Honeysuckle Creek 25/09/1994 to 05/10/1994

Fires close to the Project Area (not recorded)

- Bradshaw's Creek 23/12/2009 to 28/12/2009 mapped but not in Table 5.1
- Morrisons Gap Road (Mt Sheba) 2019

Fires ignited by lightning

1982 BHGSF/Nycooma lightning

2002 Gulf Mountain/Gogs Complex lightning

2002 Nycooma lightning

2009 Caves/Caves North lightning

2009 Chittick lightning

2019 Morrisons Gap Road (Mt Sheba)

2019 Pages Creek

5.3 Fire behaviour potential

Page 39

A fire under the influence of wind may travel upslope very fast, reaching assets before firefighters can attend the scene.

Comment

A generic comment not, site specific. The extreme gradient of the slopes surrounding the project area will influence the speed of fire travel without the influence of strong wind. The speed of fire travel up the escarpments could pose a

threat to live and safety of personnel within the project area. The nature of the terrain means that fire may not be detected before the site is overrun or could be evacuated safely.

No specific modelling is available for the project area. RFS modelling of a fire starting near the Nundle Sawmill, on a day of mild conditions could engulf Hanging Rock Village within 2½ hours if not controlled within the first hour. A distance of approximately 4km with a rise of 400 metres. The speed of spread is influenced by slope not weather in this instance. (Appendix 4)

5.4 Firefighter and public safety

Page 53

As reported by AFAC (2018) wind farms can interfere with local and regional radio transmissions by physical obstruction and radio frequency electromagnetic radiation (Australian Wind Energy Association 2004). The risk of radio communications affecting emergency response operations would be considered in the planning stages of the development however is expected to be manageable.

Comment

Experience during fires within and surrounding the project area has shown difficulties with radio communications due to black spots caused by the terrain and forest conditions.

The information is not site specific and should be assessed on ground.

Table 5.4 Summary of Bushfire Risk Factors

Page 55

Natural ignitions such as lightning strikes are likely and historically common across the region. Human induced ignitions (both accidental and arson) are also known to occur. The risk of the fire starting as a result of a lightning strike is actually reduced by the presence of wind turbines. A built-in lightning protection system safely dissipates the electricity from the blades or the nacelle into the ground.

Comment

Research indicates that the height of the towers increases the incidence of lightning strikes particularly on mountains.

"It has been observed that number of lightning strikes to tall structures and the percentage of lightning discharges initiated from the structure, what we call upward lightning, increase with tower height."

(A Calculation Method of Effective Height of Structures in Lightning Studies - Takatoshi Shindo [IEE] Transactions on Power and Energy Vol.132 No.3 pp.292–293 DOI: 10.1541/ieejpes.132.292))

Research also indicates a possibility of increased lightning strikes in the vicinity of wind towers although a variety of factors influence the incidence of lightning in the surrounding area. *"If a tall structure constructed, number of cloud-to-ground lightning flashes around the structure may increase or decrease by the effects of the structure. Several studies have been carried out to clarify the effect."*

Saito et al. [61] investigated the lightning striking characteristics to wind turbines in the coastal area of the Sea of Japan. They compared the lightning density around a wind turbine and found that the lightning density in the area within 3 km from a wind turbine is several times larger than that in the area 9 km from the wind turbine. They call it a 'hot spot'. The increase of lightning in the area is due to the occurrence of upward lightning from the wind turbine . . ."

"However, an increase in the number of lightning occurrences by the construction of wind turbines has been observed in Europe [62,63]. In Ref. [62], number of lightning strikes within about 1 km of a wind turbine is compared with that in a reference area that is 2.5–3 km from the wind turbine at 50 onshore and 2 offshore sites. Observation data by the European Cooperation of Lightning Detection (EUCLID), which is a LLS operated in Europe, show that the number of lightning strikes around wind turbines was higher than those of the reference area by 64.1% for negative strikes and 28.7% for positive strikes, on average. Note that the increase does not appear at all sites; in fact, the number of lightning strikes decreased after the construction of a wind turbine in some sites."

(Lightning Striking Characteristics to Tall Structures - Takatoshi Shindo [IEE] TRANSACTIONS ON ELECTRICAL AND ELECTRONIC

ENGINEERING

IEEJ Trans 2018; 13: 938–947))

Considering the close proximity of the ecologically sensitive Ben Halls Gap Nature Reserve and Crawney Pass National Park to the Project Footprint the potential risk of increased lightning strikes within a 1 to 5 kilometre of the Project Area is an unacceptable risk.

Research shows that there will be an increased lightning intensity around the towers. Irrespective of the effectiveness of the lightning protection methods built into the towers and blades a the probability that lightning could cause equipment failure and ignite a fire in the turbine exists. If the engineering design of the lightning protection cannot be assessed with a risk profile of "Exceptionally Unlikely" the risk probability is unacceptable for the location of the Project.

Page 56

Bushfire at Waterloo Windfarm: During this event transmission infrastructure, meteorological towers and guy-ropes were difficult to see; this infrastructure does have potential to limit the effectiveness of aerial firefighting operations.

Comment

Detailed design features of the Project need to be completed before assessment of the impact on infrastructure on aerial firefighting operations.

TABLE 5.4 Summary of Bushfire Risk Factors

Page 61

Damage to ecological values/assets

The risk that wind farm itself will cause a fire is minimal.

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Comment

The possibility of equipment failure appears to be discounted. While fires in wind turbines is not common the presence of large quantities of oil in mechanical components and electrical equipment and lightning strike means that there is a potential fire risk. The location of the Project Footprint in close proximity to the ecological sensitive and scientifically valuable Ben Halls Gap Nature Reserve poses a risk of burning material igniting a fire outside the Project Area.

Considering the height of the towers and high velocity of the wind over the wind turbines should not be positioned within 500 metres of the eastern boundary of the Project Area.

6.1 Asset Protection Zone

Page 62

The specifications recommended for the APZ are as follows:

- *• APZ will not extend beyond the property boundary or rely on actions being undertaken by adjacent landowners. This includes the neighbouring National Parks estates;*
- *• Mineral earth fire break ie dirt or gravel;*
- *• No trees and shrubs planted within the APZ; and*
- *• Where possible, increase the distance between the trees and the APZ.*

Comment

Due to the high rainfall and steepness of the terrain mineral earth containment lines should be allowed to grass over until required for fire suppression during periods of active fire. Mineral earth tracks are prone to developing gutters in periods of high rainfall.

Increasing the distance between trees and the APZ may not be possible for WT40 to WT44 due to the proximity of BHGMR on the east and the escarpment on the west.

6.6 Water Storage

Page 67

The large dam on Nycooma (31°37.781'S 151°8.476'E) was used as a water supply for both vehicles and aircraft during the 2019/2020 bushfire season. As the wind farm development aims to increase the accessibility of the ridgeline to fire fighters and improve strategic fire advantages that already exist, access to water will be maintained such that existing water resources will remain available at all times to support firefighting activities. The requirement for any additional open water supplies (ie large dams) to be provided along the ridgeline will be confirmed in consultation with NSW RFS.

Comment

The availability of the Nycooma dam is contradictory with Table 2.2 Summary of Key Consultation on Page 10.

Page 10

Proponent Response

- *• Ensure that Project does not reduce or restrict access along this ridgeline.*
- *• Increase water supply along ridgeline for both vehicle and aerial firefighting.*
- *• Nycooma dam may not be available.*

Comment

The siting and spacing between Wind Turbines may preclude the safe operation of helicopters drawing water if sites for large dams with reliable inflow are constructed along the ridgeline. Maintaining the availability of the Nycooma dam for helicopters during firefighting operations must be a priority.