Bats and Windfarms:
a brief overview of the proposed 'Hills of Gold Windfarm'.

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The number of wind turbines is rapidly increasing globally as the demand for renewable energy grows. While wind power plays a vital role in reducing carbon emissions, it also has negative consequences for the environment. These include noise and visual pollution, habitat fragmentation, wildlife displacement and direct collision risk for bats and birds. Then there is the issue of disposal of the turbine blades when they reach the end of their useful life.

Wind Energy Partners Pty Ltd (ENGIE) is pushing to have their 'Hills of Gold Windfarm', built on the ridgelines in the middle of four karst areas (Timor, Crawney Pass, Glenrock and Barry) containing significant caves and the township of Nundle to the north. This ridgeline is the divide between the Hunter Valley to the south, Manning River to the east and the Peel River to the north in NSW. The project site borders with the Crawney Pass NP and the Ben Halls Gap Nature Reserve. While NHVSS is not opposed to windfarms in general, this particular proposal has many detrimental environmental aspects which ring alarm bells to the point that the majority of our members feel it should not be constructed in the proposed location.

NHVSS has made a number of submissions against the installation of this huge windfarm comprising 70 wind turbines. The windfarm, if constructed will involve the bulldozing (total destruction) of 2.067 km^2 of native vegetation (including old growth forest) plus 2.8 km^2 of other vegetation. A total of 4.87 km^2 of vegetation would be cleared to build the proposed windfarm. This would result in loss of animal habitat (particularly threatened and vulnerable species habitat), soil erosion which may affect downstream karst areas and river systems, and the impact of spinning turbine blades on airborne creatures (e.g. bats and birds). The Environmental Impact Statement (EIS) identifies thirteen threatened terrestrial fauna species that were directly observed within the development footprint. In addition, there were a number of species of microbats and at least two species of raptor most at risk of collision.

There are only eight species of microbat recorded in the project EIS study, however there are at least 12 species of microbat which have been recorded in the Timor area (Hoye 2008; Rutledge et al. 2008) just kilometres from the project site. This indicates that the EIS study is cursory and was not conducted over a significant time period nor covered sufficient area to be credible. NHVSS members have observed and reported in the *Newcaves Chronicles*, very large populations of cave dwelling bats (numbering in the thousands) in caves at Timor, Crawney Pass, Glenrock Station, Ellerstone, Barrington and Barry (Figs 1 & 2).

Figure 1: Bentwing bats in Main Cave, Timor

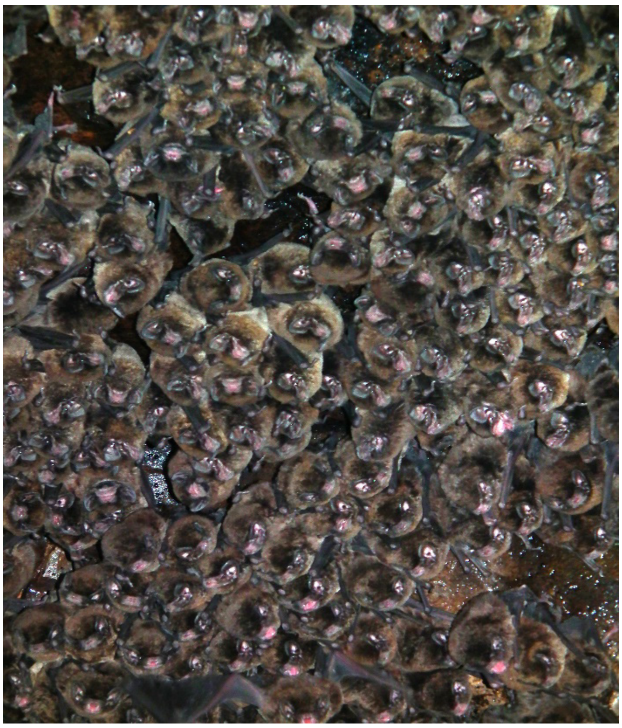

Figure 2: a cluster of 500 Bentwing bats in Main Cave, Timor

The proposed windfarm is within the nightly feeding range of both the Eastern bentwing bat (*Miniopterus schreibersii oceanensis*) and the Eastern horseshoe bat (*Rhinolophus megaphyllus*), cave dwelling bats which reside in the above-mentioned caves. However, both cave dwelling and forest bat species will be impacted by the proposed windfarm.

The EIS mentions nothing about the large regional population of Bentwing bats and their flight paths between the significant roost sites at Barrington Cave (Tomalla), Main Cave (Timor), Barry Cave (Barry Station), Bats and Bandicoot Cave (Glenrock Station) and Crawney Pass Caves. Barrington Cave has in the past been observed to have hundreds to thousands (numbers are seasonal as they migrate between sites) of Bentwing Bats (Rutledge 2003; Helman 2002; Scott 2001). Caves in the other above-mentioned areas have been recorded with similar numbers exceeding a thousand individuals.

Very little has been mentioned about the Crawney Pass limestone caves which are roosting sites for microbats less than 1.5 km from the turbines. It is well documented that both micro and mega bats fly considerable distances in search of food each night. The proposed windfarm is well within the nightly foraging range of cave dwelling bats as well as forest bats. Also not considered in the EIS are the countless disused mines, adits and rock shelters where colonies of microbats may be resident close to the windfarm site.

The impact on threatened forest dwelling bat species identified in the EIS, such as the Eastern falsistrelle, Eastern freetailed bat and Yellow-bellied sheathtail bat would be substantial. The Yellow-bellied sheathtail bat and Eastern falsistrelle rely on mature hollow-bearing trees offered by the native forest woodlands along the ridges proposed for construction of wind turbines. Likewise, the Eastern freetailed bat relies on mature trees with hollows or loose bark to roost under. Loss of suitable habitat is unacceptable to these vulnerable species.

There are far too many issues to cover in this article, so I will briefly cover a couple of NHVSS's concerns with examples of relevant studies from abroad.

Bats at risk

A recent UK study found that windfarms negatively affected over 30 bat species and have potential consequences for bat population viability, particularly species which already have low numbers. Insufficient studies have been undertaken in Australia to measure the impact of windfarms, particularly in areas within close proximity to wooded and vegetation areas where bats reside and forage.

Despite over a decade of research on bat fatalities at wind farms around the world, relatively little is known about why wind turbines kill bats (Richardson et al. 2021). Lintott et al. (2016) surveyed 46 windfarms across the UK and found that pre-construction acoustic surveys, which form part of Environmental Impact Assessments, are poor predictors of bat casualties at windfarms. Their study determined that "bat activity recording during pre-construction surveys may not accurately reflect activity levels post construction". The study also mentioned that bats may be changing their behavior around turbines and even attracted to windfarm sites because of ultrasound emission from turbines and increased prey availability. There may also be other yet to be identified reasons for the increased bat activity around windfarms.

The study by Richardson et al. (2021), determined that even if bats were foraging closer to the ground, they would still be at risk of collision with the blade tips as they neared the ground. The turbine blade minimum sweep height above the ground at many sites where bat kills occurred, was 30 m above the ground and the bats were also being killed with blades with a clearance of 40 m above the ground. Their study looked at bat activity and bat kills across locations at 23 British windfarms and included a broader UK survey of bat activity around wind turbines.

Richardson et al. (2021) stated "Given that more than 50% of bat fatalities in Europe are *P. pipistrellus*, these findings help explain why Environmental Impact Assessments conducted before the installation of turbines are poor predictors of actual fatality rates".

It would be logical to assume that the Hills of Gold Windfarm EIS bat survey is considerably lacking as it only determined there were eight bat species in the area, however a survey at nearby Timor Caves undertaken by Hoye (2008) identified an additional four micro bat species. The EIS bat survey using acoustic bat recognition, was undertaken at just a few selected locations around the project site and over a relatively short period of time. It is also inconceivable that this short survey could be considered as adequate. As determined by extensive studies overseas, a pre-windfarm assessment is not a predictor of likely bat fatalities if the windfarm is constructed.

The above comments have only given cursory consideration of potential bat impact with wind turbines. The potential turbine blade impact with flying foxes and birds, would no doubt be significant if turbines are constructed in the proposed locations.

Vegetation and vulnerable species.

The proposed wind farm would have a significant impact on the threatened ecological communities of the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland. There were also endangered and vulnerable fauna species found on the study site including Koala, Large-eared Pied and Spotted-tailed Quoll and Greater Glider to name a few.

The clearing of 4.86 km² of established vegetation will enable soil erosion to occur, which could affect the downstream karst areas that contain caves and specialized eco systems. Building a windfarm is not justification for clearing habitat of these threatened and endangered species and others not listed above. There are plenty of other localities around the NSW where hills have been denuded of vegetation in the past due to early agricultural practices.

Figure 3a

Figure 3b

Figure 3c

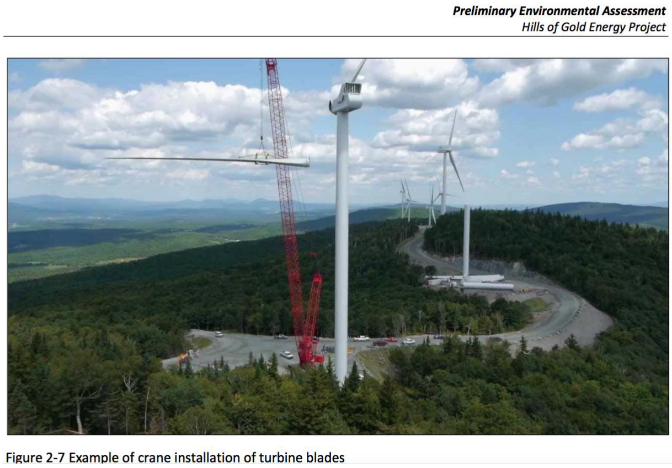

Figure 3d

Figures 3 a-c: Example of clearing in Far North Queensland during a Wind Farm construction like that proposed by the ENGIE 'Hills of Gold Windfarm' south of Nundle NSW, Photos by Steven Nowakowski.

Figure 3d: an example of a windfarm depicted in the preliminary EIS.

Worn-out turbine blades a recycling nightmare

An issue rarely raised is, what happens to the wind turbine components such as the blades when they reach their use by date and have to be replaced? Turbine blades are constructed of a composite of fibreglass and resin to withstand hurricane-force winds. They have a life span of 20 to 25 years in which time they become fatigued, and their strength is compromised. The problem of disposal, then becomes an issue at the end of their useful life. At present there is no feasible way of recycling the material, nor disposing of them. As Tom Leonard (2022) reveals there is a graveyard where 4000 worn-out giant turbine blades cover a 25-acre field in Sweetwater Texas, USA. Each blade can be 300ft (100m) long and weigh 8 tons. The scale of the immense mountain of discarded turbine blades is hard to visualise.

Researchers are looking for ways to separate the resin from the fibres or possibly grind the blades into small pellets to use in other products, however, to date no viable large-scale process has been identified (Leonard 2022).

Given the situation in the USA and no doubt other countries around the world, it is reasonable to expect that Australia is heading down the same path of what to do with damaged or worn-out turbine blades in the future.

The 'Hills of Gold Windfarm' EIS, states there are currently 114 operating wind farms in Australia, another 26 in construction and 70 in the pipeline. So, unless a way of recycling or an environmentally friendly method of disposal is found, there will be huge mountains of waste turbine blades in the future. The Hills of Gold Windfarm will be using turbine blades of 83.5 m in length and when installed the overall tip height will be 230 m AGL.

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ACKMA Online Forum Sunday 9th October – LED lighting in caves

Following the show of interest at the October 2021 meeting, the committee has agreed to hold another online forum to discuss matters of interest to cave managers, guides, and scientists. Dr Liz Reed from the University of Adelaide will open with a keynote talk on her research into the effects of LED lighting on the cave environment. Following this there will be an Open Forum where participants can share their experiences and views on best practice in cave lighting and what pitfalls to avoid.

We anticipate that the forum will commence at 10:00 AEST on Sunday morning and will run for not more than two hours. Full details of the programme and Zoom connection will be sent by email to ACKMA members via the mailing list.

The forum will be recorded and placed on both the ACKMA website and a Dropbox site so members can view them at a convenient time if unable to view them at the nominated time. Links will be sent to participants.

Dave Gillieson and Liz Reed