Northern Territory Environment Protection Agency
Level 1 Arnhemica House
16 Parap Road
Parap

08/12/2023

To whom it may concern,

Re: Comment on the additional information to the draft Environmental Impact Statement for the Australia-Asia Power Link project

I am concerned about the potential impact of the overhead transmission lines (OHTL) on the ghost bat (*Macroderma gigas*), particularly in the Pine Creek and Katherine regions. The ghost bat is listed as Vulnerable under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) due to continuing population declines. In my opinion, the additional information provided by Australia-Asia PowerLink to the draft Environmental Impact Statement does not sufficiently address the potential impacts on the ghost bat and does not demonstrate the use of the precautionary principle when data on the potential effects of the OHTL on ghost bats is lacking.

Pine Creek

The preferred OHTL route is proposed to run approximately 395 m away from Kohinoor adit, located on the outskirts of the Pine Creek township, with the nearest tower located approximately 600 m away. Kohinoor adit supports the largest known congregation of ghost bats, numbering up to 1500 individuals (N. Hanrahan, unpublished data), which at a minimum, represents 15% of the global population of ghost bats, estimated to be less than 10,000 individuals (TSSC, 2016). Kohinoor adit is continuously occupied and is important as both a mating congregation site, and as a parturition site, where pups are raised until they are weaned (Hanrahan, 2020). Ghost bats have high fidelity to their natal site with females returning to their birth roost to reproduce (Worthington-Wilmer *et al.* 1999). More broadly, the region surrounding Pine Creek is a stronghold for the ghost bat with (likely) genetically interconnected roost sites throughout the region, that are important for the persistence of the species.

The close vicinity of the OHTL to Kohinoor adit represents a particular concern. The project has the potential to directly impact the Kohinoor adit roost site and/or bats in the vicinity of the roost with ghost bats documented to forage in and around the proposed OHTL corridor (Tidemann *et al.* 1985; Ruykys *et al.* 2023). A disruption to the roost site and/or to foraging behaviour either through the removal of foraging habitat, impact on prey species or as a barrier to foraging areas (e.g., east of the proposed OHTL corridor) could have a significant impact on this very important colony.

Katherine region

Within the Katherine region, ghost bats are known to roost in caves in Cutta Cutta Cave Nature Park and Kintore Caves Conservation Reserve (Ruykys et al, in prep), with likely suitable additional roosting habitat in the Tindall Limestone formation. The species is known to travel nightly up to 25 km from the roost to forage (Augusteyn *et al.* 2018; Bullen *et al.* (2023; Ruykys *et al.* in prep) and therefore ghost bats from these two sites are likely to traverse the proposed OHTL corridor on a regular basis.

Specific Concerns

1. The OHTL has the potential to impact ghost bats through:

    a) Direct collision with the power lines or towers – ghost bats may selectively use echolocation when traversing areas familiar to them or when foraging, instead relying on visual and acoustic stimuli (Kulzer et al, 1984). As a result, ghost bats are susceptible to collision with newly placed structures particularly close to the roost. For example, ghost bats have been observed colliding with structures such as fences that have been placed in the vicinity of their roost (N. Hanrahan, personal observation). Therefore, both the lines and towers may represent a collision risk.

    b) The electric and/or magnetic field produced by the OHTL - There is a lack of studies on the impact of electric and magnetic fields (EMF) on bats, with only one study assessing bat response to dynamic EMF (Nicholls and Racey 2007), which found that bat activity decreased in areas with an EMF strength of greater than 2 v/m. No studies have been conducted on the effect of static EMF on bats, the type of EMF that is produced by OHTL, let alone ghost bats, and thus we cannot confidently state that the OHTL will have no impact on this species. As bats are unique in how they use sensory perception for foraging and navigation, care must be taken to not attempt to apply findings relating to other animal groups to bats.

    Magnetoreception is used by many fauna species, including some bats, to navigate large distances (Levitt *et al.* 2022; Holland *et al.* 2008). In bats, cellular magnetite detects the earth's magnetic field and allows compass orientation (Holland *et al*, 2008). EMF has been demonstrated to interfere with this process impacting orientation in a number of (non-bat) species (Levitt *et al.* 2022). Although ghost bats are not migratory, males and non-breeding females disperse widely outside of the mating season (Worthington-Wilmer 1994; 1999), in some cases over 100 km from their original roost (Toop 1985). As no studies have been conducted to determine if ghost bats use magnetoreception it cannot be assumed that the species does not. If magnetoreception is used by ghost bats, they may be reluctant to traverse the OHTL, potentially creating a barrier to gene flow among regional roost sites that are currently genetically interconnected and rely on congregation sites such as Kohinoor adit for mating and parturition. The omission of static EMF as a potential threat to the ghost bat from two sources, Bat Call WA (2021) and TSSC (2016) has been used as justification for discounting the potential impact of the OHTL on ghost bats (Section 8.4.3.1). Neither of these documents can be considered exhaustive or be expected to include all potential future threats. See Levitt et al. (2022) for a comprehensive review of the potential impacts of EMF, including static EMF on wildlife.

    c) Noise - In Section 8.3.2, the proponent states that their activities will not exceed 55 dB and that a noise threshold of 70 dB has been found to be suitable for avoiding adverse impacts to ghost bat roosts, referencing Bat Call WA (2021). This threshold relates only to drilling activities (Bullen and Creese 2014; Armstrong 2010) and was defined in the Pilbara region, an area of very different geologies and environmental conditions to the Top End of the NT and therefore may not be relevant.

    d) Blue glow (corona effect) - High voltage powerlines can emit blue light, through the ionization of the air surrounding the powerlines, particularly when the humidity of the surrounding air is high. Different frequencies of light affect the foraging behaviour of bats and the type of effect differs by species (Rowse et al. 2016). Studies into the impact of

light pollution on ghost bats have not been conducted, therefore we cannot dismiss the potential that blue light could disrupt the foraging behaviours of ghost bats either by repelling bats (Rowse et al. 2016), or by attracting bats e.g. by attracting more insects to the area (e.g. Brehm *et al.* 2021), increasing the number of insect-eating bats foraging in the vicinity of the OHTL and increasing the chance of collision with the lines or towers. The proponent does not address the potential impact of the corona impact on ghost bats.

To reduce the potential impact on the threatened ghost bat, Australia-Asia Power Link should strongly consider moving the OHTL corridor a considerable distance from Kohinoor adit taking into consideration the location of other ghost bat roost sites in the region, or ideally burying the power lines that traverse the Pine Creek and Katherine regions.

Thank you for the opportunity to provide comment on this project.

Yours sincerely,

Nicola Hanrahan, PhD

Relevant Bio: Dr Nicola Hanrahan received a BSc in Zoology from University College Dublin and PhD in Animal Ecology from Western Sydney University. Since 2015, Dr Hanrahan's research has focussed on the ghost bat, with her PhD specifically investigating the acoustic ecology of the ghost bat in the NT, including the Pine Creek region.

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