Submission: Bango Wind Farm EIS

Introduction

I support the development of renewable energy generation in NSW and am not opposed to the Bango Wind Farm in its entirety. However, I am opposed to some aspects of the project that I believe will impose an unfair impost on some non-associated dwellings and have concerns about ecological impact, particularly in relation to endangered vegetation communities and endangered fauna.

The issues raised in this submission regarding 'neighbours' to the project relate to impacts on landowners not associated ('not involved') with the project who have dwellings in very close proximity (<2km) to the closest turbine, namely Residence 282 (located to the north of the Kangiara cluster); and Residences 235 and 76 (located to the south of the Kangiara cluster). Detailed comments in this submission pertain to Residence 282 but the principles can be applied to all non-associated dwellings in close proximity to turbines.

Note that in the EIS, Residence 282 is listed as an approved DA site but construction of a house here began in early 2016 and is near completion. This site is therefore not a hypothetical dwelling, it is a real house. A neighbour agreement was offered since the production of this EIS but was rejected. The three major areas of concern for these properties are noise, visual impacts and potential loss of resale value.

General Comment about Consideration of Non-Associated Dwellings by the Proponent

Section 4.6.2 states "Wind turbines are placed further from non-associated landowners than associated landowners in order to minimise impacts". This is misleading, as not all associated dwellings are closer than non-associated dwellings. There are 21 associated/involved/host dwellings listed in the EIS. Ten are located further away from a turbine than Residences 76, 235 and 282 (Residences 55, 96, 108, 159, 161, 162, 164, 173, 182, 189). In addition, Residence 21 is closer than only Residence 76, being further away than Residences 235 and 282. There are only 9 'involved' dwellings that are located closer for both layouts than all three of the non-associated dwellings located <2km of a turbine (Residences 9, 20, ,32, 41, 87, 100, 119,160, 225). Residence 117 is closer to a turbine than all three dwellings apart from Residence 282 layout 2. Eight further non-host property owners have dwellings within approximately 2km of a wind turbine but have signed neighbour agreements (Residences 101, 115, 136, 154, 155, 158, 172, 238). Six of these are located closer to a turbine than Residences 76, 235 and 282, one is equidistant and one is further away.

If properties with neighbour agreements are added to the 'associated' pool, 12 associated/involved dwellings in total are further away from a turbine than at least two of these non-associated dwellings for both layouts, while 16 (55%) are closer. If neighbour agreements are removed from calculations, <u>only 10/21 (48%) of associated (host) dwellings are closer to a turbine than the three non-associated dwellings located <2km from a turbine.</u>

Noise

Acoustic modelling indicates both layout 1 and layout 2 can meet the SEARs for these three dwellings. However, there is better compliance with layout 1, with its smaller turbines, allowing some margin for error. Layout 2 allows no margin for error for Residence 282 for operating speeds of 9m/s and 10 m/s. For 8 m/s and 11m/s the predicted level is only 1dB(A) below the requirement. This indicates a reasonable likelihood that the requirements may not always be met under some operating conditions, particularly when taking into account that these predictions are based on a regression analysis using measurements taken from a location further away from the nearest turbine and in a different direction from it compared to Residence 282 [predicated noise levels for Residence 282 were derived from data obtained from Residence 170, which is located 2800m east of its closest turbine and Residence 282 is 1711m (layout 1)/1653m (layout 2) north east of the closest turbine]. Because these figures are derived from a regression

analysis, the predicted noise level does not reflect the maximum predicted noise at the location, but rather, is a statistical prediction that a certain percentage of events will fall under a line. The percentage confidence interval does not appear to be stated in the EIS but it cannot be 100%. This is easily appreciated in Appendix 10, where data points are plotted against the SA guidelines. Taking Residence 170 as an example, hundreds of data points exceed the recommended noise limits and some are more than 50dB(A).

It should also be noted this noise assessment was based on turbines of 185m tip height (p166 of EIS), whereas a tip height of 200m has been put forward by the proponents. Clearly the noise assessment will not necessarily be valid if larger turbines are used and it will need to be redone, revalidated and reassessed for compliance if different turbine models are used for the final project (as acknowledged in the EIS p 171). It is also noted that no tonal penalty was applied – if necessary, the levels would certainly exceed the requirements.

Given the nature of the modelling used and the marginality of compliance for some operating speeds, particularly for layout 2, if this development is approved the owners of these close proximity, non-associated dwellings should, at minimum, expect very stringent monitoring of noise compliance and full access to any monitoring data should they request it. Contingency strategies must be in place and implemented rapidly should any turbine exceed the noise criteria.

On page 176 and in Chapter 20 of the EIS, the proponent states that '*If, during operation, wind turbine noise impacts are identified as having the potential to exceed the applicable limit……then an 'adaptive management' plan can be implemented as a contingency strategy to mitigate or remove the impact. This process could include:*

- *Investigating the nature of the reported impact*
- *Identifying exactly what conditions or times lead to undue impacts*
- *Consideration of operating wind turbines in a 'noise optimised' mode during offending wind directions and at night time (sector management)*
- *Providing acoustic upgrades (glazing, façade, masking noise etc.) to affected residences; and*
- *Turning off or operating in a noise reduced mode those wind turbines that are identified as causing undue impact*'

This is not adequate – an 'adaptive management plan' **must** be implemented if noise conditions are breached. At a minimum, this **must** include investigation and identification of the cause and at least one solution. Solutions should involve modification to wind turbine operations in the first instance. Permanent alterations to an affected residence or the provision of additional noise as masking should only be at the owner's request. These approaches would only mitigate noise inside a residence in any case, outdoor amenity would still be diminished.

A better approach than waiting until a problem arises and then trying to somehow address it, would be to remove or relocate one or more of the closest proposed turbines to reduce noise effects on non-associated residences from the outset. This would also help address high visual impacts for these properties (see below).

In addition to operational noise, construction noise is predicted to exceed 40dB(A) at a distance of 1.7km (i.e., at Residence 282) during the construction phase (p 174 Vol 1 main report and Table 13 Appendix 10). A separation of 2400m is required to meet the criterion of less than 40dB(A) for some construction activities. Therefore, a number of non-associated properties, including Residence 282 are classified as 'noise affected' during the construction phase according to ICN guidelines. I note the requirement for the developer to undertake to apply all feasible and reasonable work practices to reduce this, and to inform the residents of the proposed construction work. A better mitigation for Residence 282 would be to remove or re-site one or more turbines from the northern arm of the Kangiara cluster so that construction work takes place no closer than 2400m away.

Visual Impact

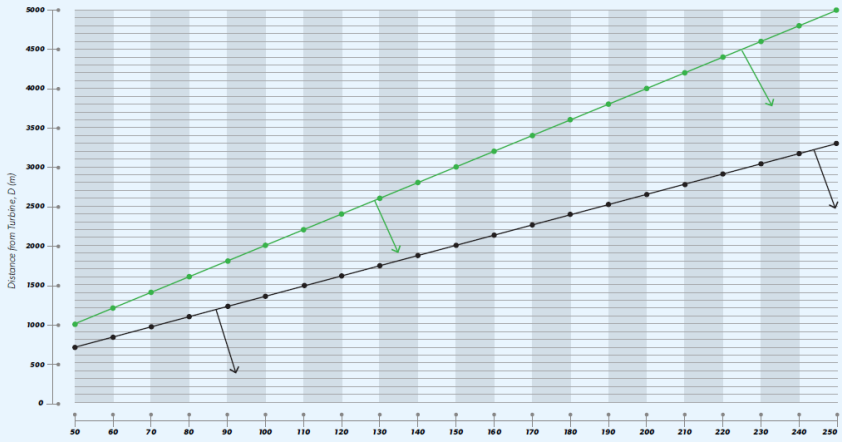
Residence 282 and Residence 235 both have high visual significance ratings (VSR) but are not involved in the project. All other dwellings with high visual impact are either hosts or have a neighbour agreement (Chapter 8 main report). Residence 76 has a medium VSR. Only 8 involved/host dwellings have a medium or higher visual significance rating, thus the majority of host landowners are not being unduly impacted by visual effects of the project. It seems to be grossly unfair that two non-associated neighbours to the project should be subject to a much higher visual 'penalty' than most of those who have agreed to be involved. Under the new framework (Visual Impact Assessment Bulletin (VIAB), August 2016), the equivalent category for Residence 282 would also be the highest for VSR i.e., V1Z1 (Level 2 viewpoint, moderate scenic quality 1-2km distant).

According to Figure 5 in the VIAB (reproduced below), 'moderate' landscapes require detailed justification for 200m turbines that are located closer than 2.65km and for 160m turbines that are located closer than 2.12km to a residence. Yet Residence 282 is only 1711m away from the nearest proposed turbine for layout 1 and is even closer for layout 2 (1653m), with turbines proposed to be up to 200m in height. There has been no justification provided for why this close proximity is deemed acceptable.

Table 8: Visual Performance Objectives

FVIA Factor	Visual Influence Zone 1 *(High Significance)*	Visual Influence Zone 2 *(Moderate Significance)*	Visual Influence Zone 3 *(Low Significance)*
1. Visual Magnitude	Objective: Avoid turbines or provide detailed justification of turbines below the green line.	Objective: Apply impact mitigation and / or provide detailed justification of turbines below the black line. Consider screening between the green line and the black line.	Objective: Consider screening below the black line.

Figure 5: Visual magnitude levels for VIA



It should be noted that the photomontages provided in the EIS are based on layout 1 but the visual impact for Residence 282 would be greater for layout 2 as the nearest turbine is closer. It should also be noted that the proponent has already increased the proposed total height of the turbines by 8m since the montages were produced. In addition, although PM10 is the closest viewpoint to Residence 282, the view towards the turbines is at a different angle to how the turbines would be seen from Residence 282. PM10 may also be at a lower altitude because Residence 282 is sited at an elevated location to take advantage of district views. It should be noted that no photomontages were provided specifically for Residence 282, from either the property or the public road most adjacent to it (as they were for 13 other non-associated dwellings within 2km of a wind turbine), which is a requirement of the 2011 draft guidelines (p 155, Vol 1 main report).

As the line of sight from Residence 282 would be directly along the ridgeline running parallel to Harrys Creek Road and the site is somewhat elevated, the view from residence 282 is likely to be dominated by many turbines in the foreground (predicted by Green Bean Design) and, I believe, the middleground. In

the words of the consultant in regard to this residence: '*Short distance views will extend west to south west toward wind turbines within the Kangiara cluster. Whilst existing tree cover will provide some filtering of views, the distance between the approved dwelling locality and the wind turbines will result in opportunities for proximate and direct views toward wind turbines*.' (Table 18 Appendix 8 Vol 3, Table 18). These are not 'opportunities', they are imposts.

In addition, Residence 282 will also be subject to cumulative visual impacts. Residence 282 is easily within 8km of all three clusters in the Bango wind farm and it is likely that the Rye Park wind farm will also be visible (EIS -A3 Figures- Part 3- Visual 8.4a, 8.4b. Note that Residence 282 has been omitted from Fig 8.5a). It can be predicted that turbines might be seen through more than three 60 degree sectors from Residence 282. Assessment of cumulative visual impacts according to sectors will be a requirement of the new framework if the VIAB is accepted (VIAB, p. 7).

Once all these points are considered, it is likely the visual impact on Residence 282 is actually in the very high end of 'high' when cumulative impacts are added to proximity impacts.

I agree it is fair and reasonable for there to be a requirement for mitigation of medium to high VSRs for non-associated residences as a condition of approval of the development application. However, this should not be required only for the construction/operation and maintenance stages (Chapter 20)—it is difficult to imagine what mitigation could possibly be successful for Residence 282 after either of the proposed layouts is constructed. Given the very high visual impacts on Residence 282, mitigation should include pre-approval/pre-construction mitigation strategies, the most effective of which would be removing or re-siting one or more turbines from the northern end of the Kangiara cluster so the criteria put forward by the VIAB are met according to the size of the turbines finally used (i.e., a minimum of 2.7km for 200m turbines). Additional post-approval mitigation would still be required if the VSR is medium, medium high or high for the final layout.

Real estate values

Limited data are available regarding resale value effects of being in close proximity to wind turbines for relatively small rural residential properties. However, as serenity and rural views are often major attractions of such properties, it would be expected that these are potential marketing highlights that would be adversely affected by noise and visual impacts. Residence 282 is somewhat elevated to provide district views. These will now be dominated by wind turbines in at least one sector and turbines will be visible in others. Noise may be able to be maintained at permissible levels, but this is not the same as near silence, which would the case for much of the time at present, especially at night. It is reasonable to expect that some potential buyers would not consider buying a property this close to a turbine regardless of the price and that others would expect to pay significantly less than they would have otherwise.

Ecological Impacts

Removing one or more turbines from the northern arm of the Kangiara cluster would also have ecological benefits. Removal of turbines in this location would reduce impacts on the critically endangered Golden Sun Moth, which was recorded at this location by the fauna survey (Fig 5.3b Appendix 12) and on Apple Box-Yellow Box Grassy Woodland-Derived Native Grassland in moderate to good condition (A3 Figures Part 1 Project Description Fig 3.10), which is an Endangered Ecological Community (EEC) under the TSC Act. Well over 90% of Box- Gum Grassy Woodland and Derived Grassland communities have already been lost from the Lachlan CMA (Appendix 12 Part 2 p.135). The ecological assessment found that the wind farm as proposed will have significant impacts on the Golden Sun Moth and Box-Gum Woodland (B-GW) (Appendix 12, Section 7.5). Any reduction in impact is therefore important.

In addition, removal of one or more of these turbines would also be expected to reduce the risk of Wedge-tailed Eagles being killed, as one of only six nest sites in the entire study area is located adjacent to this part of the wind farm. The Wedge-tailed Eagle is known to be particularly susceptible to wind farm

development because it is at relatively high risk for blade strike and is significantly impacted by loss of high trees (p.209 EIS Main Report).

In Table 10.6 (p.211 EIS Main Report), it is stated that access to the Kangiara cluster was changed from being via Tangmangaroo Road to a more direct route from Lachlan Valley Way to avoid removal or modification of intact B-GW located along Tangmangaroo Road. Not only is this an EEC, the report states that it also provides habitat for threatened species, including the Squirrel Glider. How is the remnant B-GW going to be protected when road upgrading, especially widening, is done for Tangmangaroo Road to accommodate oversize vehicles (Chapter 12)?

The two more eastern of the substation options near the junction of Tangmangaroo Road and Harrys Creek Road appear to be more likely to impact on Golden Sun Moths than the third (i.e., more western) option. There is also Apple Box – Yellow Box Grassy Woodland – Moderate to Good Condition – EPBC (CEEC under EPBC Act and EEC under TSC Act) where the more easterly options are located. Both this vegetation community and fauna species are critically endangered, therefore it would appear that the western option would be preferable from an ecological perspective.

It is noted that many mitigation measures (Table 6.3 Appendix 12 part 2 and Chapter 21) are phrased with interpretable wording (for example, 'where possible', 'where practical/practicable' 'should be') instead of the stronger wording of 'will' or 'must'. Justification needs to be provided if particular mitigation commitments are not met.

Summary and Conclusion

Impacts on non-associated residences

I believe there is unjustifiable impacts on some non-associated residences for both layout 1 and layout 2.

- Only 10 residences in total are projected to have a 'High' visual impact from the project. Of these, only three are turbine hosts while two are un-associated residences less than 2km from a turbine with no neighbour agreement (Residences 282 and 235). Two other non-associated residences have Medium-High visual impacts (Residences 62 and 260). This is an unfair and unjustifiable severity of impact for un-associated residences, particularly for Residences 282 and 235.
- While predicted wind turbine operational noise at non-associated residences has been modelled to meet the required noise guidelines, the predictions are derived data, compliance is borderline at some operating speeds at some residences and predictions are based on turbines smaller than those likely to be used. Therefore, it is very possible that once the wind farm is operational, noise may exceed the permitted maxima at some non-associated residences that are located in close proximity to a turbine, particularly if less than 2km away.
- Some non-associated residences will also be 'noise affected' (ICN guidelines) during the construction period, especially as a 40 dB(A) level is expected to be unable to be met at less than 2400m from the site for some construction activities (Table 13 appendix 10).
- While there are insufficient data to make a clear projection about whether resale property values will be adversely affected , it is indisputable that amenity will be affected for residences in close proximity to a turbine and this is a major marketable feature of some properties.
- Removal or relocating one or more of the closest turbines would provide some mitigation of these effects.

Ecological Impacts

There are serious impacts from the project on endangered ecological communities and endangered species, including the critically endangered Golden Sun Moth.

- Removing one or more turbines from the northern arm of the Kangiara cluster would reduce impacts on the critically endangered Golden Sun Moth and Apple Box-Yellow Box Grassy Woodland Derived Native Grassland, an EEC. It could also potentially reduce the mortality risk for Wedge-tailed Eagles.
- Clarification needs to be provided as to how remnant B-GW is going to be protected when road upgrading, especially widening, is done for Tangmangaroo Road
- The presence of Golden Sun Moths and Apple Box – Yellow Box Grassy Woodland – Moderate to Good Condition – EPBC (CEEC under EPBC Act and EEC under TSC Act) needs to be considered when considering substation options near the junction of Tangmangaroo Road and Harrys Creek Road.
- It needs to be ensured that mitigations are carried out as per the commitments detailed in Chapter 21.

Conclusion

In relation to Residence 282, which has been the focus of this submission, given the severity of the impacts of visual amenity and the borderline compliance with noise requirements even with the turbines used for modelling, I believe that any mitigation must include removal or re-siting of one or more turbines from the northern end of the Kangiara cluster. This should be at least to the extent indicated by the Figure 5 black line in the VIAB of the proposed new Wind Energy Framework, i.e., a 2.7km setback for 200m high turbines. Removal of these turbines would have the added advantage of reducing the impacts on endangered vegetation communities and endangered fauna species, including one that is critically endangered, and would likely reduce risk to Wedge-tailed Eagles. If this development application is approved in any form, there must be stringent compliance with all conditions related to minimising impacts on protected vegetation and fauna, including during road upgrading and mitigation of all undue impacts on non-associated residences.