Golden Valley I Wind Farm

Biodiversity Action Plan

Draft

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Contents

1. The Project

Golden Valley is a 48-turbine wind energy facility with installed capacity of 120 MW, within the Cookhouse Renewable Energy Development Zone (REDZ) in the Eastern Cape Province of South Africa. Turbines will have a hub height of 90 m and a rotor diameter of 121 m. A 6.5 km grid transmission line will be built to connect to the grid.

In accordance with IFC GN6 - GN91 the project has developed this Biodiversity Action Plan (BAP). This BAP describes the holistic approach of the project to mitigation of potential impacts on biodiversity, including steps to ensure no net loss of natural habitat where feasible. This is a living document, which should be revisited and updated if necessary annually. The text below provides the context, whilst Table 1 presents the detailed action plan.

2. Priority biodiversity features

2.1. Natural Habitat

The project is situated within Natural Habitat. The two main vegetation types are Bedford Dry Grassland in the flatter higher lying ground to the east, and the Great Fish Thicket on the slopes and lower lying ground in the west. The site is split over seven privately owned farms and the land use is livestock farming on the natural vegetation.

2.2. Critical Habitat

The project is not situated in Critical Habitat for any species or ecosystem.

2.3. Protected and Internationally Recognised Areas

There are no Protected or Internationally Recognised Areas intersecting or near to the project or its defined Area of Influence.

2.4. Bird species of concern

Several bird species recorded on site are of high conservation concern. These species are prone to impacts from wind farms and overhead power lines, and are regionally or globally Red Listed: These species include most importantly:

- Cape Vulture *Gyps coprotheres*
- Black Harrier *Circus maurus*

- Martial Eagle *Polemaetus bellicosus*
- Blue Crane *Anthropoides paradiseus*
- Ludwig's Bustard *Neotis Ludwigii*
- Southern Black Korhaan *Afrotis afra*
- Secretarybird *Sagittarius serpentarius*

The status of these species at the Project site is outlined in the Critical Habitat Assessment (WildSkies, 2019). Apart from Blue Crane, all have been recorded on site infrequently and/or in small numbers. Blue Crane is resident on site and four nests were recorded in 2018.

Cape Vulture is a species of especially high stakeholder concern. The project site is within the foraging range for summer-roosting vultures at the Agieskloof roost to the north. There is a past record of a concentration of vultures near to the project site, presumably at a carcass, but the lack of records in recent surveys suggests that this is not a favoured foraging area.

3. Potential impacts

The project could potentially impact on natural habitat through

- Destruction/alteration of vegetation
- Displacement of birds from site and disturbance of birds
- Mortality of species that are important ecological components of natural habitat through:
    - Collision with turbine blades
    - Collision or electrocution on overhead power lines

Of the species of concern identified, mortality from turbine collisions could occur for all species but is most likely for the raptors (Cape Vulture, Black Harrier, and Martial Eagle), mortality from power-line collisions is most likely for cranes and bustards, and electrocution on power lines most likely for raptors.

The project will take rigorous measures to avoid and minimise, and where possible restore, potential impacts, to reduce residual impacts on natural habitat as much as possible.

If unavoidable residual impacts occur, the project will take measures to offset these where feasible, to achieve no net loss for natural habitat.

4. Impact mitigation

4.1. Avoidance measures already implemented

The project has undergone an Environmental Impact Assessment level avifaunal impact assessment study (Endangered Wildlife Trust, 2010), pre-construction bird monitoring (WildSkies, 2013), site specific avifauna walk down/ground truth (WildSkies, 2015), and a second round of pre-construction monitoring (WildSkies, 2018). All of this work has identified sensitive and constrained areas on site for all bird species and these have subsequently been avoided through project design. Further mitigation measures have been included in the site-specific Construction Environmental Management Plan (CEMP). These measures have collectively ensured avoidance and minimisation of most potential biodiversity impacts.

4.2. Destruction/alteration of vegetation

Vegetation will be cleared for siting of turbines and access roads. The primary mitigation measures for this impact have already been detailed in the site specific Environmental Management Plan. Adherence to this plan will need to be enforced and measured.

4.3. Displacement of birds from site & disturbance of birds

Construction activities will be carefully controlled to ensure that disturbance through earth moving, machinery, vehicular and staff activity is kept to a minimum. The site specific Environmental Management Plan will be adhered to. The project has sited turbines and the grid-connection power line outside nesting areas for the Blue Crane (the only sensitive bird species recorded breeding on site), more than 300 m away from known Blue Crane nest sites to minimise displacement

4.4. Bird mortality through turbine collision

A number of mitigation measures will be implemented for collision of sensitive bird species. Apart from those measures already implemented to date, the first step is to develop a 'Fatality Threshold Policy' as this will guide how and when further mitigation will be implemented. Mitigation measures which will be employed include removing potential vulture food sources on site through a 'Cape Vulture Food Management Programme' (see Procedure B). As a proactive measure a turbine shutdown on demand (SDOD) programme will be compiled to ensure a plan of action is in place in case SDOD is required in the future.

4.5. Bird mortality through collision/electrocution on power lines

The project will ensure that anti bird collision line marking devices are installed on the grid connection power line in line with good practice recommendations, in order to reduce potential bird collisions, especially of crane and bustard species. The project will also ensure that the pylons are designed and built 'bird friendly' (with sufficient clearances to avoid electrocution). Both these aspects will be inspected/audited by an independent avifaunal specialist on completion of construction to ensure adequate protection for birds.

5. Impact measurement

This will primarily be measured through bird monitoring during operations. An initial two-year phase will be implemented, compliant with good practice guidelines (see Procedure A). Monitoring will assess at minimum:

- Injuries or fatalities of birds or bats caused by collisions with turbines and/or power lines
- Presence, activity levels and nesting of priority bird species on site
- Potential displacement of bird species by turbines
- Implementation and effectiveness of the vulture food management programme and of bird diverters/flappers on transmission lines
- Monitoring of the Agieskloof Cape Vulture roost site.

Continued monitoring will be needed over the lifespan of the project. The monitoring approach (including effort level) may however be adjusted based on the findings of the initial monitoring period.

6. Time frames

Time frames are specific to each mitigation action as shown in Table 1. Broadly speaking however the following three phases are evident:

1. Phase 1 - Pre-operations phase. This phase is from now until the commencement of operations at the wind farm (estimated at Q4 2020). During this period there are several actions that need to take place in preparation for operations – see Table 1.
2. Phase 2 - First two years of operations. This is the period during which full operational phase bird monitoring will be conducted as per best practice.
3. Phase 3 - Remainder of operational lifespan. The actions in this phase will be largely determined by findings in Phase 2 above, and designed to ensure continued effective mitigation and monitoring of potential impacts.

7. Actions to achieve net gain for vultures

The project is not considered to be in Critical Habitat for Cape Vulture. However, considering stakeholder concerns about this species, and the potential for cumulative impacts across wind power projects, the project intends to achieve a net gain for Cape Vulture.

Mitigation measures on site (the 'Cape Vulture Food Management Programme', and implementation of shut-down on demand, if required) are expected to reduce collision fatalities to near zero for Cape Vulture. No biodiversity offset for Cape Vulture is thus anticipated.

Nevertheless, the project will take a pro-active approach to support Cape Vulture research and conservation in the region, in addition to implementing mitigation on-site. This programme will achieve gains for the species as outlined in IFC Guidance Note 6, footnote 15, and will involve the following activities:

1. As recommended in IFC GN6 (GN23), GVI will seek to develop partnerships with recognized and credible conservation organisations involved in Cape Vulture conservation, specifically the Endangered Wildlife Trust and BirdLife South Africa.

2. The Project will join and contribute to a collaborative effort between operational wind farms in the Bedford-Cookhouse area that is under development to holistically address risk to Cape Vulture, and offset impacts where needed. This is expected to include research into Cape Vulture movements (e.g. through satellite tagging) and the role of food availability in and around the project. It will also include broader habitat protection where feasible, including the investigation of biodiversity stewardship options in the area, to ensure that habitat is secured and managed correctly. These actions are expected to benefit the species in the long term, but gains not be easily quantifiable.

3. GVI will conduct a survey of existing power lines within the Area of Influence. This will establish a baseline of mortality of sensitive bird species on these power lines and identify unsafe power lines that require retrofitting. An appropriate programme of retrofitting will then be developed and implemented.

Action 3 will benefit all species of concern (section 2.4) that are at potential risk of collision or electrocution from power lines, not only vultures. These gains should be quantifiable.

8. Offset of impacts

The IFC define 'biodiversity offsets' as *"measureable conservation outcomes resulting from actions designed to compensate for significant residual adverse biodiversity impacts arising from project development and persisting after appropriate avoidance, minimisation and restoration measures have been taken".*

IFC GN6 further states "*A biodiversity offset should be designed and implemented to achieve measurable conservation outcomes*[3] *that can reasonably be expected to result in no net loss and preferably a net gain of biodiversity; however, a net gain is required in critical habitats. The design of a biodiversity offset must adhere to the "like-for-like or better" principle and must be carried out in alignment with best available information and current practices.*"

With the mitigation measures planned for the project, including adaptive management as needed (section 11), it is not expected that offsets will be required.

Should monitoring show that mitigation measures are not proving effective in reducing Cape Vulture fatalities to near zero, a biodiversity offset would need to be developed and detailed in an Offset Management Plan. This plan would build on the ongoing actions outlined in section 7, but with activities designed and scaled to produce measurable gains that at least outweigh losses.

9. Roles & responsibilities

The responsible person for each action is described in Table 1. In summary, there will be a need for BioTherm to contract and train several teams of staff on site (bird & bat carcass search team and Cape Vulture Food Management Team). These staff must be appropriately selected, resourced, trained and managed. Several of the actions will require the contracting of an avifaunal specialist. There will also be a requirement for collaboration and consultation with Endangered Wildlife Trust and BirdLife South Africa and other external entities where relevant.

10. Budget

Rough estimates of budget for each action are presented in Table 1.

11. Adaptive management of impacts

Monitoring results will be used to inform refinement and improvement of mitigation measures, to ensure that these are as effective as possible. These changes can be encapsulated in an annual review of this BAP. The project will develop a fatality threshold policy for priority species, with input from relevant stakeholders. If fatality thresholds are exceeded this will trigger action to identify and implement further effective mitigation actions, for example observer-led shutdown on demand. The project will set aside a contingency mitigation budget annually, to cover additional mitigation needs if these arise.

Table 1 below summarises the various actions required.

Table 1. Summary Biodiversity Action Plan for Golden Valley I Wind Farm.

Impact	Mitigation	Measurement	Time frame	Responsibility	Budget
Construction phase					
1.Destruction/alteration of natural habitat	A. Adhere to site specific Environmental Management Plan including avifaunal walk down (ground truth) of all project components (WildSkies, 2015).	Independent site inspection/audit on completion of construction	Q4 2020	Avifaunal specialist – contracted by BioTherm	A. TBC
	B. Ensure prey availability for raptors on site is not enhanced by construction of facility. Disturbed ground to be compacted and replanted with appropriate vegetation. Spoil material removed from site. Waste management on site to be tightly managed to avoid any habitat enhancement.	See A above			
	C. All construction activities strictly managed to best practice standards to avoid any unnecessary impact on receiving environment.	See A above			
Operational phase					
2.Displacement of birds from site	D. Implement Blue Crane Management Plan (WildSkies, 2018)	Measure through operational phase bird monitoring compliant with best practice guidelines (see Action 3 H below & Procedure A)	Q4 2020 to Q4 2022	Avifaunal specialist – contracted by BioTherm	TBC
3.Bird fatality through collision with turbine blades	E. Develop fatality threshold policy for each priority species. Include input from relevant stakeholders. Define triggers for mitigation & identify potential adaptive management actions	GVI Bird Fatality Threshold Policy document	Prior to operations – i.e. prior to Q4 2020	Avifaunal specialist (with consultation) –contracted by BioTherm	TBC
	F. Develop turbine shutdown on demand protocol (SDOD) including training of key staff, particularly for Cape Vulture	Shut Down on Demand (SDOD) Protocol	Within first 6 months of operations i.e. prior to Q3 2021	BioTherm & avifaunal specialist	TBC

	G. Implement On site Cape Vulture Food Management Programme (see Protocol B)	Effective programme in place	Prior to operations– i.e. prior to Q4 2020	BioTherm	TBC per annum
	H. Measure bird fatalities through conducting two years operational phase bird monitoring compliant with best practice guidelines (see Procedure A). Fatality searches will likely need to continue for full operational phase.	Monitoring reports	Q4 2020 to Q4 2022	Avifaunal specialist – contracted by BioTherm	TBC
	I. Install 'Bird Guard' perch deterrents on all Eskom Transmission towers within 2km of turbines to deter Cape Vultures from perching close to site	Perch deterrents installed	Prior to operations– i.e. prior to Q4 2020	BioTherm/Eskom	TBC
4.Bird fatality through collision or electrocution on grid connection power line	J. Adhere to site specific EMP avifaunal walk down report (WildSkies, 2015). This included installation of bird flight diverters to mitigate for bird collision.	Independent site inspection/audit on completion of construction	Prior to operations– i.e. prior to Q4 2020	Avifaunal specialist – contracted by BioTherm	TBC
	K. Measure fatalities through conducting two years operational phase bird monitoring compliant with best practice guidelines (see Protocol A)	Monitoring reports	Q4 2020 TO q4 2022	Avifaunal specialist – contracted by BioTherm	TBC
	L. Maintain anti bird collision line marking devices in working order	Line patrols during operational phase	Full operational phase	BioTherm/Eskom	TBC
5. Additional conservation actions	M. Join & support collaboration between operational wind farms in the Bedford-Cookhouse area to holistically address risk to Cape Vulture (Protocol D).	Collaboration strategy in place	Prior to operations but managed adaptively throughout operational phase	BioTherm	TBC
	N. Once off survey of all existing power line ≤132kv within project Area of Influence to document baseline bird fatalities & identify high risk power lines for retrofitting. Retrofit identified power lines. Subsequent survey every 2 years	Survey report & retrofit plan	First two years of operations	BioTherm	TBC

References

Endangered Wildlife Trust, 2010. Avifaunal impact assessment for the “Cookhouse Wind Farm” (which was the original name for a larger site including the Golden Valley I site and the Golden Valley II site). Unpublished report submitted to EOH-CES.

WildSkies, 2013. Pre-construction bird monitoring for the Golden Valley I site. Unpublished report submitted to Terrapower.

WildSkies, 2015. Avifaunal walk through for the Golden Valley I Wind Farm. Unpublished report submitted to EOH-CES.

WildSkies, 2018. Pre-construction bird monitoring for the Golden Valley I Wind Farm. Unpublished report submitted to BioTherm.

WildSkies, 2019. Critical Habitat Assessment for the Golden Valley I Wind Farm. Unpublished report submitted to BioTherm.

Protocol A – Operational phase bird monitoring programme

Work done to date on the GVI site has established a baseline understanding of the distribution, abundance and movement of key bird species on and near the site. However this is purely the 'before' baseline and aside from providing input into turbine micro-siting, it is not very informative until compared to post construction data. The following programme has therefore been developed to meet these needs. This programme will be implemented immediately after construction is complete. This programme is designed to comply with the 2015 Best Practice guidelines for birds and wind energy (Jenkins *et al*., 2015) but should be updated if any future updates to the guidelines become relevant.

Operational phase bird monitoring must be conducted for a minimum of two years, longer if significant impacts or needs are identified.

Live bird monitoring

This component of monitoring must repeat as closely as possible the methods used to collect data pre-construction. These are repeated below

- The 9 walked transects of 1km each that have been done during pre-construction monitoring should be continued.
- The 5 vehicle based road count routes should be continued, and conducted twice on each site visit.
- The 2 focal sites (a large farm dam & the Agieskloof Cape Vulture roost) should be monitored. If any sensitive species are found breeding on site in future these nest sites should be defined as focal sites. The Blue Crane breeding population on site should also be monitored in order to determine breeding success in each season. This must be done by an independent qualified ornithologist.
- All other incidental sightings of priority species (and particularly those suggestive of breeding or important feeding or roosting sites or flight paths) within the broader study area should be carefully plotted and documented.
- The 6 Vantage Point locations used to date should be increased in number if necessary to ensure adequate coverage of all turbine positions within 1.5km from a vantage point. The exact positioning of these points may also need to be refined based on the presence of new turbines and roads. The number of hours/days of coverage of these points needs to be significantly increased from the previous 12 hours of observation/vantage point (x6)/season (x4) or a total of 288 hours observation in 12 months. This is not sufficient coverage of the year to adequately capture data on Cape Vulture in particular. An increase in effort is required for operational monitoring to a total of 96hrs of observation be conducted per month on the full site or a total of 1 152 hours in 12 months. The breakdown into hours per vantage point will be designed in detail by the avifaunal specialist. It is possible that in order to

accommodate this increase in observer effort, observers may work alone rather than in pairs (as previously). In order to achieve this, the expectation is that observers based close to site will be trained and developed, and employed part or full time. This function can be combined with the SDOD programme, as the skills required to conduct vantage point monitoring are partially similar to those for SDOD. It is critical that the correct people be employed in these positions, with an aptitude and passion for working long hours outdoors in all conditions.

- The activities at the control site (approximately 6km north-west of the GVI site) should be continued, i.e. 1 Vantage Points, 3 Walked Transects, 1 Vehicle Based transects.

Bird Fatality estimates

A team of 'carcass searchers' must be employed full time to search under turbines for bird fatalities. The area surrounding the base of turbines should be searched (up to a radius equal to 75% of the maximum height of turbine) for bird collision victims. The frequency at which these searches need to be conducted will be at least every 5 work days. Any suspected collision casualty should be comprehensively documented (for more detail see Jenkins *et al*, 2015). It is also important that associated infrastructure such as power lines and wind masts be searched for collision victims according to similar methods.

It is important that in addition to searching for carcasses under turbines, an estimate of the detection (the success rate that monitors achieve in finding carcasses) and scavenging rates (the rate at which carcasses are removed and hence not available for detection) is also obtained (Jenkins *et al*, 2015). Both of these aspects can be measured using a sample of carcasses of birds placed out in the field randomly. The rate at which these carcasses are detected and the rate at which they decay or are removed by scavengers should also be measured. These bias trials should be suitably designed and coordinated by an independent avifaunal specialist.

Protocol B – On Site Cape Vulture Food Management Programme (CVFMP)

The goal of the on-site "Cape Vulture Food Management Programme' is to ensure that less food is available on site for vultures. This means making dead animals unavailable to vultures before they find them and feed on them. Making dead animals unavailable to vultures can consist of any of the following:

- total removal of carcass from the site (take care when disposing that other risks aren't created);
- burial of carcass;
- covering of carcass with branches or black builders plastic etc (temporary measure).

The general protocol to follow is as follows:

1. Site management proactively engage with landowners to ensure cooperation and understanding, including reporting of dead animals by farm staff.
2. CVFMP team appointed, trained and equipped with GPS, camera, binoculars, PPE, transport?
3. All site staff and dedicated CVFMP team instructed to report any dead animals to site manager.
4. Dead animal reported to site manager by phone.
5. CVFMP team dispatched immediately to dead animal location if not already there.
6. Site manager reports to landowner and requests removal of dead animal.
7. Time until dead animal is removed is tracked.
8. If vultures already feeding staff should be allocated to chase vultures away and 'guard' dead animal until removal (note that care should be taken that chasing birds does not create a high collision risk situation. In some instances it may be better to leave the birds. Seek advice from avifaunal specialist).
9. CVFMP Register (see below template) is completed with all relevant details so that data can be evaluated

Cape Vulture Food Management Plan - Register								
Date	**Time**	**Source of report**	**Carcass type**	**# Vultures present**	**Location (closest WTG)**	**Landowner**	**Response action**	**Response time**
28-Feb-19	10h00	Farmer	sheep	0	21	Smith	sheep removed	2hrs

Protocol C – Regional Cape Vulture research programme

The following research programme is currently underway, implemented by the Endangered Wildlife Trust with support from Amakala Emoyeni Wind Farm.

GVI will seek to collaborate with the Endangered Wildlife Trust on this and provide additional financial support where necessary.

1. Cape Vulture movement study
    - Capture and fit suitable GPS tracking devices on ten adult Cape Vultures from Agieskloof roost (devices will capture 12 positions for the bird per day).
    - Analyse tracking data to determine movement pattern and assess vulture habitat use in the area.
2. Cape Vulture Roost survey
    - Conduct a thorough survey of existing data sources and a physical ground survey for additional Cape Vulture roost sites within a 50km radius of the three wind farms
    - Obtain accurate locations of all such roosts, including historic roosts.
    - Visit these roosts (including the known Agieskloof roost) for 12 months to obtain accurate estimates of birds using the roost.
    - As far as possible determine bird age structure at roosts.
3. Establishment of Supplementary Feeding Site (SFS)
    - In parallel with above, we will use the tracking data to establish optimal locations for SFS. We will do this in collaboration with local farmers, conservation authorities, communities and landowners in each area, we will set up an operational structure whereby the SFS are established, managed and maintained locally. This will include the production of a management plan for each restaurant, including budgets, feeding rosters, staff and volunteers
    - Ensuring a reliable and consistent supply of carcasses are available for each SFS (sourcing carcasses from roadkill, livestock farms, hunters and butcheries).
    - We will closely monitor the changes in foraging movements following the establishment of SFS to determine the effectiveness of using these to encourage birds to forage away from areas of high risk.