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2024 IMPACT REPORT

Kenya Vulture Conservation Project



Introduction

I am pleased to present the 2024 impact report for the Kenya Vulture Conservation Project. In this report we share updates on the onsite conservation efforts conducted at the Kipeto Energy wind farm, along with the offsite conservation initiatives and community impact work carried out in five local communities surrounding Kipeto Energy.

Throughout 2024, we have collaborated with the Kipeto Biodiversity Committee and its non-profit partners to advance vulture conservation while promoting renewable energy production at Kenya's second-largest wind farm. Key highlights from the year include completion of two studies: one aimed at identifying bat species and their movements at the wind farm, and another focused on reducing livestock predation events in local communities. Kipeto continued to successfully implement the shutdown-on-demand process at the wind farm, which resulted in only four fatalities among priority species in 2024. Additionally, project partners working through the Kipeto Biodiversity Committee increased community livelihoods through training in modern beekeeping and supplied 180 beehives to community members to ensure these skills could be applied and sustained. The Biodiversity Committee continued to focus on building predator-proof bomas (livestock enclosures), which have proven to be effective in reducing human-wildlife conflict, with no attacks reported in 2024. The bomas remain an effective approach to reducing predatory attacks on livestock and resulting incidences of retaliation—and are proven to help protect and grow local vulture populations.

Wind energy is a central focus of power generation in Kenya, and critical for enabling the country to meet increasing demand for electricity. However, concerns about the negative impact wind farms can have on declining vulture populations rightly remains. Both the Kipeto Energy shutdown-on-demand process and community engagement activities are helping to set a high standard for accomplishing renewable energy generation alongside the promotion and protection of local biodiversity and community benefits.

We are excited to continue our collaboration with the Kipeto Biodiversity Committee and its dedicated local non-profit partners, as we strive together to find solutions to sustain vulture populations in Kenya well into the future.

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Cover: A White-backed Vulture in Olerai Conservancy's vulture sanctuary in southern Kenya looks over a juvenile in its nest. White-backed Vultures will roost in colonies in the tops of trees. © Bobby Neptune; This page: Wind turbines from Kipeto wind farm at sunrise. The wind farm is located on the edge of Africa's Great Rift Valley and on a ridgeline frequented by soaring raptors. © Bobby Neptune

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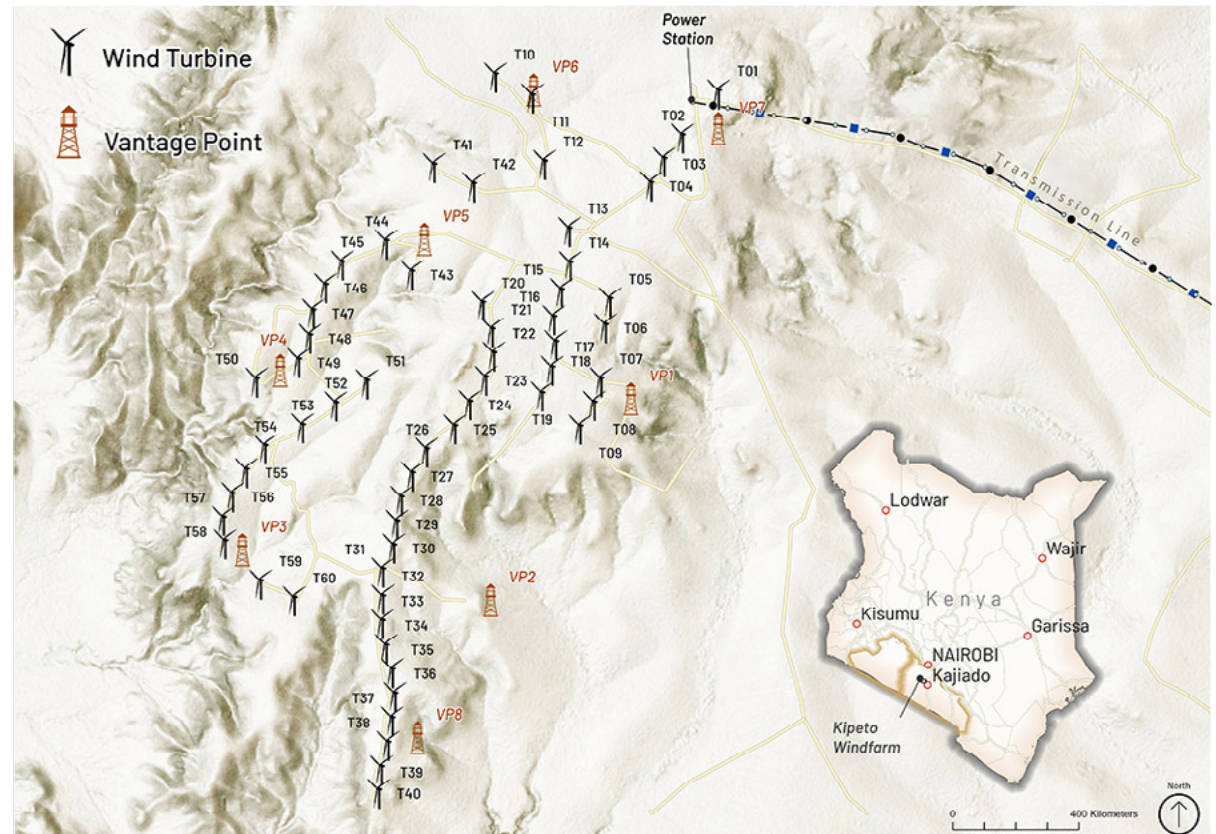
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How It All Began

The Launch of the Kenya Vulture Conservation Project

In 2020, the Kenya Vulture Conservation Project was launched when Kenya Vulture Conservation, LLC, provided a USD 10 million fixed-rate loan to fund the Kipeto Energy (Kipeto) wind farm to advance local conservation efforts detailed in the Kipeto Biodiversity Action Plan (BAP). Kipeto is located in Kajiado County, 45 km southwest of Nairobi, Kenya and commenced commercial operations in July 2021. Pursuant to the loan agreement, Kipeto must allocate annual funds for vital vulture conservation initiatives throughout the project's duration to be managed by the Kipeto Board's biodiversity sub-committee. Kenya Vulture Conservation, LLC maintains a seat on the Biodiversity Committee, which allows them to offer technical support to Kipeto and local non-profits engaged in implementing the BAP, encompassing both onsite mitigation and offsite vulture conservation activities.



PROJECT CONSERVATION GOALS INCLUDE →

- Promoting vulture conservation in the area served by the wind farm by ensuring annual funding from Kipeto is provided to community-based vulture conservation initiatives
- Providing direction, support, and oversight for such vulture conservation activities
- Demonstrating the feasibility of innovative renewable energy investment structures to generate substantial and scalable long-term funding support for environmental conservation in Africa

Right: Rüppell's Griffon Vultures roost on tall vertical cliffs and bring up their young on the relative safety of these perches.
© Bobby Neptune





Kipeto Wind Power Project

Renewable Energy & Onsite Mitigation

The Kipeto wind farm remains Kenya's second largest wind power project spanning approximately 70km² and featuring 60 wind turbines capable of generating 100MW of power—enough to power approximately 250,000 homes¹. Wind energy is the third largest source of energy production in Kenya, representing approximately 13% of energy produced for the year ending June 30, 2024, according to Kenya Power and Light,² the nation's primary energy provider. Kipeto is located at the eastern ridge of the Rift Valley which features rolling hills, mountains, and dormant volcanoes making it an ideal site for a wind farm. However, this terrain also attracts raptors and other soaring birds who use the warm air currents to conserve energy as they fly. Unfortunately, this can lead to birds striking the wind turbines, negatively impacting bird populations.

According to the International Union for Conservation of Nature's (IUCN) Red List of Threatened Species, four of the nine vulture species found in Kenya are critically endangered,³ meaning they are facing high risk of extinction in the wild. The Kipeto Biodiversity Committee has identified several priority bird species as being of particular concern in the region of

the Kipeto wind farm, with these species split into two categories. Category 1 priority species are critical to the local ecosystem with a conservation goal of a net gain in population while Category 2 priority species are important components of the local ecosystem with the goal of no net population loss in the area. Priority species include the Rüppell's Griffon Vulture, White-backed Vulture, Martial Eagle and Verreaux's Eagle. In 2024 two additional species—the Augur Buzzard and Tawny Eagle—were added to the priority list based on observations since commercial operations began in 2021.

To mitigate the risk of bird strikes, Kipeto has established an onsite biodiversity team of 36 staff that monitor and track bird activity during daylight hours from eight vantage points around the wind farm to identify priority species at collision-risk height. The biodiversity team is led by a Lead and Deputy Lead Ornithologist and over half of the monitors are from nearby local communities. These monitors, along with project staff and other local community members, also work to identify and remove animal carcasses that might attract vultures and raptors to feed. When a priority species is observed approaching a collision risk area, the monitors coordinate with the control center to shut down the specific turbine(s), a process that took an average of 41 seconds in 2024. Throughout 2024, there were 751 shutdowns, with each shutdown averaging 4 minutes and 31 seconds. This resulted in minimal energy loss of approximately 0.01% of the total energy generated by the wind farm in 2024.

Above: Morning mist rolls up from the valley floor below wind turbines from Kipeto wind farm at sunrise. The wind farm is located on the edge of Africa's Great Rift Valley and on a ridgeline frequented by soaring raptors. © Bobby Neptune

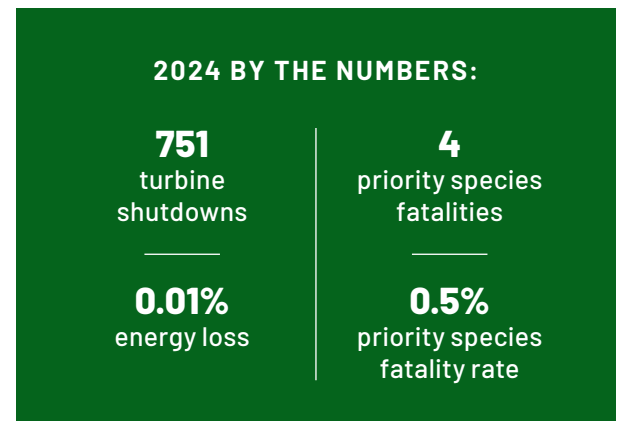


There were four priority species fatalities at the wind farm in 2024: three Augur Buzzards and one Marabou Stork (representing just 0.5% of 2024 shutdown events). Since the launch of commercial operations in 2021, a total of eight priority species fatalities have occurred at the wind farm. Because the shutdown-on-demand process has been in place since the start of commercial operations, it is challenging to quantify its exact impact on reducing bird strikes. However, a recent study on vulture strikes at wind farms in Spain found an average of 1.33 bird fatalities per turbine per year where no shutdown procedures were in place⁴. In contrast, the Kipeto wind farm has averaged 0.04 priority species fatalities per turbine per year over the past 3.5 years, which is 97% lower than the average observed in the study in Spain.

In 2024, 143 non-priority bird species and 346 bat fatalities were identified at the wind farm. This is an increase of 367% for birds and 786% for bats compared with 2023. Given the sharp rise in non-priority bird and bat fatalities seen in 2024, the Biodiversity Committee is working with the Kipeto biodiversity team to identify patterns in fatalities, including examining weather-related variables. As bat fatalities had also shown an increase from 2022-2023 with a majority of the species identified not having been recorded during pre-construction surveys, Kipeto elected to support a one-year study in 2024 to collect bat population, behavior and other demographic data at the wind farm and surrounding areas. This study has been completed and data analysis is ongoing. This information will enable the Biodiversity Committee to identify and implement the most effective bat strike mitigation measures in the future. To support development of a mitigation strategy, the Biodiversity Committee is currently working to install acoustic recorders to foster a better understanding of when and where

bats are present at the wind farm and how their presence is related to environmental conditions. In addition to the onsite mitigation planning, the Biodiversity Committee is working with local bat experts to identify breeding sites in the local communities to ensure any plans fully support the local bat populations.

Throughout 2024, The Nature Conservancy provided technical support to the Kipeto biodiversity team in transitioning from paper forms to electronic data collection and management. This enables real time analysis and minimizes potential data errors. Kipeto and The Nature Conservancy are also collaborating with local non-profit partners implementing the BAP to adopt similar electronic data collection efforts including tracking vulture nesting locations, incidents of human-wildlife conflict and vulture poisonings, community outreach events and other key data points. This shift to electronic data collection is laying the groundwork for a data dashboard that will facilitate real-time information sharing across organizations overlaid with key environmental variables such as precipitation, temperature and vegetation growth.



Left: Wind turbines from Kipeto wind farm at sunrise. © Bobby Neptune



Offsite Mitigation and Monitoring

Conservation funding provided by Kipeto through the Biodiversity Committee is distributed amongst several local non-profit organizations working to implement the Kipeto Biodiversity Action Plan. The BAP focuses on conservation of threatened vultures and other birds of prey while benefiting local communities and providing clean energy. Projects are focused on reducing human-wildlife conflict through an anti-poisoning program, ensuring the preservation of endangered species of vultures through population monitoring, and improving livelihoods within local communities to reduce human-wildlife conflict.

NAVIGATING HUMAN-WILDLIFE CONFLICT: A Comprehensive Strategy

Although fatalities from wind turbines are a significant concern and are actively mitigated at Kipeto through the shutdown-on-demand process, studies have shown the primary cause of vulture population decline in Sub-Saharan Africa is poisoning, which accounts for 62% of vulture deaths⁵. Vulture deaths by poisoning are driven by human-wildlife conflict occurring as a result of retaliatory poisoning of livestock carcasses by farmers attempting to protect herds from predators such as spotted hyenas and lions. One unintended consequence is the poisoning and death of local vultures when they feed on the poisoned carcasses—a single poisoned carcass can kill dozens of vultures. The BAP seeks to reduce this type of human-wildlife conflict in the area through community education, improved herding practices, and livestock protection.



Community Connection: From Marketplace Outreach to Community Meetings

The Biodiversity Committee works with a local non-profit organization to implement community engagement activities and an anti-poisoning program. A variety of community engagement events, including local marketplace outreach, community meetings and social gatherings and radio presentations are implemented to engage and educate the local community about the consequences of human-wildlife conflict and the value of local vulture populations. This includes strategies and best practices to mitigate conflicts, options to increase surveillance and how to respond to poisoning incidents.



A team of five Vulture Liaison Officers, 65 Vulture Volunteers, and a Vulture Program Manager work across five local areas covering approximately 8,000 km² to host community outreach programs and act as a surveillance network to identify predator attacks and wildlife poisoning events for rapid response. As a result of these efforts, in 2024, 21,991 people were reached through these community events, bringing the total since the launch of the wind farm to over 135,000 community members. In addition to community awareness events, 17 training events with rangers were held in 2024, covering how to actively respond in the case of wildlife poisonings events. Throughout 2024, there were five suspected wildlife poisonings reported, each of which was quickly mitigated, including rehabilitation of one bird of a high-priority species.



Improved Practices: Eyespot a Lion

Mitigating predation incidents during the daytime when herds are grazing can be difficult. Local herders have received training on improved herding

practices from non-profit organizations working with the Biodiversity Committee. Training includes education on ideal ratios of livestock to herders, benefits of group herding, best times for livestock to graze, understanding signals of wildlife behavior, and benefits of information sharing between locals on the locations of predators and their habitats.

One specific method of improved herding practices is an “eyespot” approach, which involves painting eyes on the backsides of cattle to deter predators. Ambush predators rely on the element of surprise, and studies^{6,7} have shown that predators are likely to abandon their attack if they think they’ve been “seen”. In July 2022, an eyespot pilot was started in an area near the wind farm. Then, in 2024 an alternate site at the Olare Orok village in the Masai Mara ecosystem began implementing eyespots to confirm the initial pilot findings. The initial 2022 pilot found that no painted cows had been attacked through December 2023; findings from the 2024 pilots are currently being analyzed.

Livestock Protection: Better Boma Boundaries

Nighttime predation incidents pose a significant risk to livestock in the areas surrounding the Kipeto wind farm. After grazing during the day, livestock are typically kept overnight inside a boma, an enclosure made of sticks, which can easily be penetrated by predators. The Biodiversity Committee is working with local non-profit organizations to build sturdier predator-proof bomas for selected community members. These structures incorporate metal fencing and fence posts as well as blinds on the lower portion of the sides to reduce visibility. Kipeto has also previously distributed predator deterrent lights to local communities to help reduce nighttime predation incidents.

Left, from top: Best herding practices baraza at Kishermoruak village within the Masai Mara landscape. © Nature Kenya; Eye spotting © Rebecca Ikachoi; A predator-proof boma constructed for a family in the Olerai community—blinds on the lower portion help reduce visibility of livestock. © Anne Trainor, Ph.D.

Throughout 2024, 20 new predator-proof bomas were built, bringing the total built to 92 since 2020. Since the construction of the predator-proof bomas, only fourteen incidents of livestock attacks have been recorded, with none occurring in 2024. Vulture Volunteers in the five focal areas surrounding the wind farm routinely monitor the predator-proof bomas to ensure they are being maintained and remain secure. Beneficiaries of the predator-proof bomas have found them to be a vital resource to reduce livestock loss and are sharing their experience and insights with other community members. A result of this information sharing is that community members have been influenced to build their own predator-proof bomas or to reinforce traditional bomas based on lessons learned. Collectively, these actions to reduce predation events are working to reduce retaliatory livestock poisoning events that threaten the area's vulture populations.

VULTURE POPULATION MONITORING: Nurturing Nature

To evaluate the impact that these onsite and offsite measures have on maintaining and growing local vulture and raptor populations, nesting locations and bird movement in and around the wind farm must be identified and tracked. The Biodiversity Committee has worked with local non-profit organizations to radio-tag vultures and raptors to track their movements and nesting locations. This data collection provides insight into the size and growth of the local vulture populations. The number of radio tags deployed remains lower than expected due to delays in obtaining permits for additional tags. The Biodiversity Committee remains in contact with non-profit partners and the Kenya Wildlife

Research and Training Institute on the next steps to increase the number of permits.

In 2024, 19 nests were monitored, and local communities identified four raptor species that successfully bred in the area, including one Augur Buzzard chick, one Eastern Chanting-goshawk chick, three Gabar Goshawk chicks, and one Peregrine Falcon chick. Successful breeding in the local area is an encouraging sign that sufficient resources are available and that the local conditions in the region are favorable to nurturing vulture populations.

COMMUNITY LIVELIHOODS: The Diversification Approach

Diversified Income: In addition to focusing on the local vulture population, the Biodiversity Committee works with local non-profits to enhance the livelihoods and provide additional income sources to local community members. By diversifying income opportunities, the likelihood of human-wildlife conflict is reduced, as families become less dependent on activities that may lead to such conflicts. Other previous community development projects included training on poultry production and bead working to provide additional sources of income to local families.

The Art of Beekeeping: In prior years, several local community groups were trained in modern beekeeping. Traditional beekeeping practices involve using logs suspended in high trees to protect from predators while modern beekeeping practices utilize hive boxes that don't need to be

suspended. These modern practices result in higher honey yields, easier access for maintenance, management and honey extraction, and allows a broader array of community members to be involved in beekeeping enterprises. The successful training was followed by a donation of beehives to the groups to put their learnings into practice. In 2024, training continued in colony management, methods of processing bee products, pests and control options, and packaging and marketing of end products. Throughout 2024, 180 beehives were distributed to local communities, bringing the total number of distributed hives to 230. Many of the beehives provided to community members were donated as an incentive for vulture conservation-related efforts.

Other Initiatives: Previously, 80 energy saving "jikos", clay stoves that use less wood, were distributed to help reduce logging activities that threaten vulture habitats. In addition, Kipeto has previously donated 10,000-liter rainwater storage tanks to local schools to improve rainwater harvesting capacity. The communities continue to benefit from these contributions.

Above: Beehives in the Olerai community distributed to local women's groups. Honey is being utilized within the community and groups are exploring opportunities to market local honey products. © Anne Trainor, Ph.D.

Into the Future

The Kenya Vulture Conservation Project is a replicable model that can be adapted and used to drive positive outcomes elsewhere. To accomplish this, we are working to share our approach and learnings with others; for example, the Kipeto wind farm's onsite mitigation work was used as an example of a successful shutdown-on-demand process in a recent Biodiversity Consultancy article⁸. The Kipeto team has hosted other wind farm developers to demonstrate the effectiveness of both the on and offsite mitigation efforts and their impacts on local communities, increasing biodiversity in the area and minimal energy production losses. Offsite mitigation work led by the Biodiversity Committee and local non-profit partners has been shared at international science conferences to show the benefits seen from implementation of the BAP.


The project team of the Kipeto Biodiversity Committee and local non-profit partners are also seeing their work influence local communities,

through increased reporting of poisoning events, and a growing number of community members building predator-proof bomas or reinforcing traditional bomas.

In addition to influencing local community practices, the transition from paper data collection to electronic data collection and sharing will allow our non-profit partners to implement similar changes to other programs, further enhancing data collection, analysis and conservation work in the area. These changes implemented by the Olerai Conservancy will be shared across the other ten members of the Athi-Kapiti Wildlife Conservancies Association. The Biodiversity Committee is emerging as a leader in monitoring and evaluation frameworks through the work of implementing the BAP. We look forward to continuing to share our knowledge on how to create similar projects and practices that can benefit conservation and communities.

ENDNOTES

- 1 KIPETO WIND FARM ENTERS INTO INNOVATIVE LOAN AGREEMENT TO FUND BIODIVERSITY—Kipeto Energy
- 2 <https://www.kplc.co.ke/storage/01JDRPZS8NZ473CWE2XCS01REJ.pdf>
- 3 IUCN Red List of Threatened Species
- 4 Griffon vulture mortality at wind farms in southern Spain: Distribution of fatalities and active mitigation measures (csic.es)
- 5 Vulture poisoning in Sub-Saharan Africa and its implications for conservation planning: A systematic review—ScienceDirect
- 6 Artificial eyespots on cattle reduce predation by large carnivores | Communications Biology (nature.com)
- 7 Painting Eyes on Cow Butts Could Save Cattle and Lion Lives | Smart News | Smithsonian Magazine
- 8 Shutdown on Demand: Reducing Bird Fatalities at Wind Farms—The Biodiversity Consultancy



Morning mist rolls up from the valley floor below wind turbines from Kipeto wind farm at sunrise. The wind farm is located on the edge of Africa's Great Rift Valley and on a ridgeline frequented by soaring raptors. © Bobby Neptune

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