ANTENEH ENGINEERING

NEW BIRD REPELLANT WIND TURBINE INVENTION

1. Problem statement

According to some resources, a study published in the journal Biological Conservation found that U.S. turbines kill 234,000 birds per year on average, while a newer study, published in Energy Science, found that about 150,000 birds are affected by wind turbines in the U.S. per year. When a bird flies into a patch of air immediately after a blade tip has passed by, the sudden drop in pressure can reportedly rupture its lungs, a condition known as "barotrauma."

There are several solutions proposed but the problem is still at large that the only solution that is found to work is stopping the wind turbine when migratory birds comes in the areas of the wind farm using a radar that can detect incoming large number of birds. Some of the proposed solutions are

- Safer locations - The simplest way to keep birds and bats away from wind turbines is to not build wind turbines where lots of birds and bats are known to fly. It's not always that simple, though, since many of the open, treeless expanses that attract birds and bats are also prime locations for harvesting wind.
- Ultrasonic 'boom boxes' - Birds are mostly visual animals, but since bats use echolocation to navigate, sound might offer a way to repel them from wind farms. That's the idea behind ultrasonic "boom boxes," which can be attached to turbines and emit continuous, high-frequency sounds between 20 and 100 kilohertz.
- New colors – painting of only one turbine with black paint has given a very promising result according to some researches.
- Radar and GPS – detecting large number of migratory birds when reaching wind farms to prevent collision by stopping the wind turbine.
- Restraint – is a sensor that can tell when something hits a wind turbine blade, giving operators a chance to prevent more collisions by shutting turbines down.

2. Our Solution

One of the major points we miss to understand when it comes to bird and wind turbine is that how birds see the turbines and interpret their vision to understanding. When birds fly high way above the height of the wind turbine, the size of the wind turbine seems not considerable size (small size) because the surface area of wind turbine seen from top side is very small. Meaning, it is very easy to notice the three rotating turbine blades at lower height or standing from the ground because the rotating blades cover large circular surface area x axis (assuming that the x-axis is perpendicular to the rotating turbine blades or parallel to the wind). But in y-axis and z-axis the surface area is small that for small airborne animals with low visual capacity and low understanding of the environment.

This project is about building a new system that can repel birds from entering wind farm which prevents collision using an effective visual technique. This is done by installing an insignificant (lightest weight) and very flexible material like fabric or sealed plastic bag filled with safe lightest gas like Helium on the very tip of the three turbine blades to create more surface area from the top view to maximize the sight for birds that will prevent them not approach the area where the turbine blade rotates. Meaning as the wind blows perpendicular to the blades, the three installed materials are forced to be perpendicular to the turbine blades or parallel to the wind and as the turbine blades rotate each of them also rotate along with each the blades being in position parallel to the wind. Since they are very flexible as each of the materials reaches the turbine tower stand, they fold at moment of contact and regain their shape instantly after contact with the tower stand. This system does not affect the efficiency of the turbines because they are insignificant (in weight) and do not alter the aerodynamic because the will be behind the turbines at all time. Based on some recent researches results, in order to maximize the visual effectiveness to keep away the birds only one of the materials is painted black.

The following diagrams shows the basic structure and working principle of the system when the wind turbine is stationary and rotating.

Figure 1 – wind turbine at stationary and no wind

Figure 2 – wind turbine at stationary and no wind

Figure 3 – wind turbine at stationary and with wind presence

Figure 4 – wind turbine at stationary and with wind presence

Figure 5 – rotating wind turbine and with wind presence

Figure 6 – rotating wind turbine and with wind presence

Figure 7 – rotating wind turbine and with wind presence

Figure 8 – rotating wind turbine and with wind presence

Figure 9 – rotating wind turbine and with wind presence

Figure 10 – rotating wind turbine and with wind presence

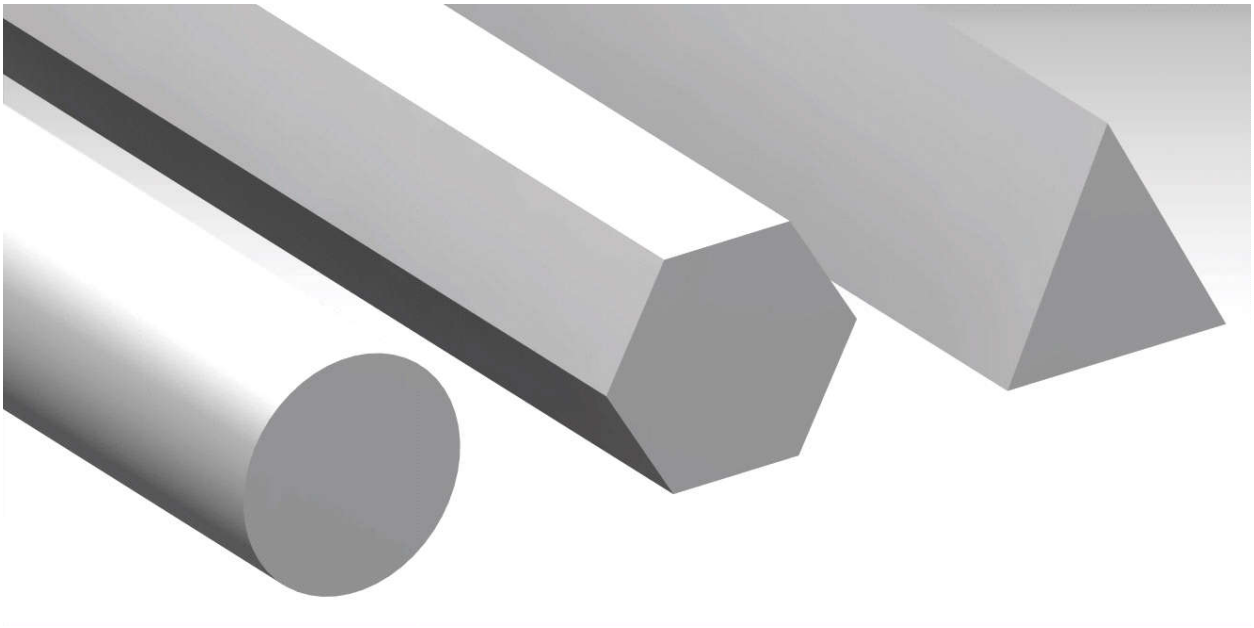

Figure 11 – Possible shape of the air bags

Inventor profile

To say few words about my background, I have dedicated my life for invention and research because not only I have big dreams but also it is my only way out of poverty. We all have a talent we know or did not find out yet. Mine happens to be inventing. I discovered this talent of mine when I was in second year student during my university life. Starting from that point everything seemed not important except creating new ideas. So, until now I have invented more than 70 inventions.

You can find some of my inventions via
https://contest.techbriefs.com/profile?user=89682
https://www.herox.com/crowdsourcing-community/antenehgashaw-123126
https://desall.com/User/AntenehGashaw/Portfolio
https://challenges.openideo.com/profiles/antenh.g/contributions#recent-contributions

My latest big international honors are

- Winner of Mechanical maker challenge by NASA/ JPL- 2019 with my design invention “Mechanical eye”
- Finalist for the TIC AMERICAS 2020 competition with my project “Caribbean Sargassum Problem” project
- Finalist in TKF plastic innovation challenge 2019 with my invention “Smart green washer”
- Top 100 inventions of 2019 by create the future contest by tech briefs with my project “Cone solar panel”
- Top 10 winner of TIA challenge 2019 with my multiple unique solutions and invention
- Finalist in Enel challenge on MV & LV distribution challenge 2019 with my invention “Turbine for avoiding birds in MV & LV distribution lines”

I believe that I have made many contributions to science so far and just to mention some,

- In the recent Hawaii natural problem challenge which is the saving the Ohi'a challenge (https://conservationx.com/challenge/invasives/ohia), I submitted more than 30 possible solution which you can see via https://conservationx.com/challenge/invasives/ohia/projects
- I have developed more that 20 inventions for solution, management and prevention of the Coronavirus (COVID-19) which you can see via https://solve.mit.edu/challenges/health-security-pandemics/solutions/22229 or https://contest.techbriefs.com/profile?user=89682
- I have designed a Green- technology that will solve the micro fiber problem in the oceans which you can see via https://2019.spaceappschallenge.org/challenges/earths-oceans/trash-cleanup/teams/the-saviors/project
- I have designed a Green- technology that will solve the micro Plastic problem in the oceans which you can see via https://contest.techbriefs.com/2019/entries/medical/9465
- I have many contribution for agriculture industry with my multiple project like https://challenges.openideo.com/challenge/food-system-vision-prize/open-submission/isolation-farming
- I have contributed to Teraforming Mars with my project Melting mars polar ice cap https://www.globalinnovationexchange.org/innovation/melting-mars-polar-ice-cap
- I have contributed on reduction of plastics in packaging in beverage industries with my project bottle belt https://contest.techbriefs.com/2019/entries/sustainable-technologies/9466

- I have invented a mechanism that will solve the hurricane crisis of the USA for good and I am looking for a department to submit my white paper which you can see via https://www.herox.com/ideas/128-solving-us-hurricane and few of my honorary certificates are shown below.

Figure 12 – NASA / JPL winners' certificate

Certificate of Achievement

This Certificate of Achievement Presented to

Anteneh Gashaw

Recognizing your submission as a Top 100 Entry in the
Create the Future 2019 Design Contest

Cone Solar Panel

Presented
November 2019

Joseph T. Pramberger
President, Tech Briefs Media Group

Figure 13 - Certificate of achievement for top 100 inventions of 2019

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2020

TIC AMERICAS

Talent and Innovation Competition of the Americas

CERTIFICATE OF PARTICIPATION

Awarded to:

Caribbean Sargassum Problem

For your participation as a Finalist of the Caribbean Innovation Competition during the Talent and Innovation Competition of the Americas (TIC Americas 2020).

Washington, DC, United States of America, July 2, 2020.

Luis A. Viguria
Chief Executive Officer
Young Americas Business Trust

Valerie Lorena
Executive Director
Young Americas Business Trust

Figure 14 - Certificate of participation for the TIC AMERICAS 2020 contest finial