Research Statement:

Wind energy is a factor of air density, rotor area, and wind speed. The equation describing the power found in a column of wind of a specific size moving at a particular velocity is:

P = ½ x rho x (pi r3) v3, where:
P= power in the wind
rho= density of the air
r= radius of swept area
v= wind velocity
pi= 3.14

From the formula, longer blades results in bigger rotor diameter and therefore a larger swept area. However, the team noted that they also add drag, so it is a decision to make between more drag and larger swept area.

Higher gear ratios result in faster spin of the small gear attached to the shaft that turns the generator that produces electrical output. However, we also needed to overcome the friction between the gears.

We innovated to make our base very stable using PVC pipes. We initially noted that less stable base does not produce good power output.

The team also note that angle of attack (pitch) and weight of the blades are major considerations to

enable faster blade spin and therefore faster speed of gear that connects to the generator's shaft.