**Laws**

 **Betz’s Law**  
Betz’s Law defines the theoretical efficiency limit of a wind turbine, stating that no turbine can capture more than 59.3% of the kinetic energy in the wind (the Betz Limit). This limit arises because some wind must pass through and around the turbine to maintain flow continuity, meaning a portion of the wind's energy remains undisturbed.

 **Lanchester’s Laws**  
Lanchester’s Laws describe the relationships between lift and drag forces on an airfoil, which are critical for wind turbine blade design. Optimizing blade shape and angle can maximize lift (which helps spin the blades) and minimize drag (which hinders movement), thereby improving the turbine's aerodynamic efficiency.

 **Kutta-Joukowski Theorem**  
This theorem explains how lift is generated on objects in a fluid flow, such as wind turbine blades. It shows that the lift force acting on a rotating cylinder or blade in a flow field is proportional to the fluid’s density, the flow velocity, and the circulation around the object. This is foundational to understanding blade performance in capturing wind energy.

 **Continuity Equation**  
The continuity equation describes mass conservation in a flowing fluid and is fundamental in wind turbine operation. For wind turbines, it shows that the flow rate of air entering and exiting the turbine’s swept area remains constant. This concept assists in determining optimal turbine size, blade shape, and placement for energy capture.