**Experiment (8) Using a Wind Turbine to Power the LED Module**

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**(i) Components Used**

* Wind Turbine Generator (Horizon model)
* LED module
* Connecting wires (Red and Black)
* Terminal board or connection base
* Fan or air source (optional for demonstration indoors)

**(ii) Objectives**

* To demonstrate how wind energy can be converted into electrical energy
* To light up an LED using the output from a wind turbine
* To understand the basic functionality of wind turbines in renewable energy systems
* To observe the impact of blade speed (wind speed) on electrical output

**(iii) Procedure**

1. First, we made sure the wind turbine was assembled and mounted in an upright position using its vertical stand.
2. The red (positive) and black (negative) wires from the turbine were connected to the LED module via the terminal block.
3. The turbine was either manually spun or exposed to a fan (if indoors) to simulate wind conditions.
4. As the blades rotated, the turbine converted kinetic energy from the wind into electrical energy.
5. The LED was observed closely to detect illumination as the turbine blades accelerated.

**(iv) Observations**

* The LED lit up when the turbine blades spun at a sufficient speed.
* As blade speed increased, the LED brightness increased slightly — showing a correlation between turbine speed and voltage output.
* Under low or no wind, the LED remained off, demonstrating that wind is the sole power source.
* The setup was successful in showing direct wind-to-electric conversion.

**(v) Precautionary Measures**

* We ensured correct polarity when connecting the LED module to prevent damage.
* We mounted the turbine securely to prevent tipping during operation.
* We Avoided placing hands near spinning blades to prevent injury.
* We used soft, controlled airflow when simulating wind indoors.
* We double-checked all connections for tightness and continuity.