

1. Discuss the wind power, tidal power and hydro power.

Ans: Renewable energy sources like wind, tidal, and hydropower are essential alternatives to fossil fuels, offering sustainability and reduced environment impact. Each utilizes natural forces to generate electricity but differs in technology, environmental effects and availability.

Wind Power:

Conversion of kinetic energy of air into electricity using wind turbines is known as wind power. Modern turbines have blades attached to a rotor connected to a generator.

$$\text{Kinetic Energy of wind } P = \frac{1}{2} \cdot \rho \cdot A \cdot v^3$$

→ P is the power

→ ρ is density

→ A is the area swept by turbine blades.

→ v is wind speed.

However, only 59.3% of this energy can be captured due to Betz limit. Wind power is intermittent, requires large land areas, and can affect landscapes and wildlife.