

RENEWABLE ENERGY SOURCES



Renewable energy - source of energy that occurs naturally and repeatedly in the environment; replenished at the same rate it is used.

Ultimate source of energy - sun, gravity (sun, moon, earth), and earth's rotation.

Indirect forms of solar energy - *wind* (uneven heating of earth's crust), *ocean* (moderate temperature gradient) and *biomass* energy. Oceans constitute 70% of earth's surface area, so they represent a large storage reservoir of the solar input. **Tides** occur due to *gravitational force* of the moon and sun, acting together with the *earth's rotation*.

Renewable Sources of Energy

- Geothermal Energy (radioactive decay and initial heat of earth)
- Solar Energy (radiation from sun)
 - Hydro
 - Solar PV and Solar Thermal
 - Wind
 - Biomass and Wastes
 - Ocean Thermal
 - Ocean Wave, Ocean Current
- Tidal Energy (gravitational pull of moon and earth's rotation)
- Hydrogen Energy (from biomass and water)

Why Use Renewable Energy?

- It is clean energy and sustainable.
- It helps preserve the various ecosystems at the point of extraction, transportation and end-use.
- It avoids the use of fossil fuels that emit pollutants like SO_2 , NO_x , CO , UHC and green house gases like CH_4 and CO_2 that contribute to global warming.
- It is free and available for man's use.
- It is generally cheaper than fossil or nuclear derived energy or power.
- In remote areas where fuel is expensive or difficult to transport or expensive to extend electricity grid, renewable energy is a viable alternative.