ENVIRONMENTAL CHEMISTRY

RENEWABLE ENERGY

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Renewable energy

What is renewable energy ?

- **Renewable energy** is energy that is collected from renewable resources which are naturally replenished on a human timescale.
- Examples

1. Sunlight (Solar Energy)
2. Wind
3. Rain
4. Tides
5. Waves
6. Geothermal heat
7. Bioenergy

Solar energy

- Solar energy is radiant light and heat from the Sun that is harnessed using a range of ever-evolving technologies such as solar heating, photovoltaics, solar thermal energy, solar architecture, molten salt power plants and artificial photosynthesis.
- Passive solar and active solar

Wind energy

- Air flow can be used to run wind turbines. Modern utility-scale wind turbines range from around 600 kW to 9 MW of rated power.
- The long-term technical potential of wind energy is believed to be five times total current global energy production.

Hydropower

- Since water is about 800 times denser than air, even a slow flowing stream of water, or moderate sea swell, can yield considerable amounts of energy.
- For countries having the largest percentage of electricity from renewables, the top 50 are primarily hydroelectric.

Wave and tidal power

- Wave power, which captures the energy of ocean surface waves, and tidal power, converting the energy of tides, are two forms of hydropower with future potential.

Geothermal energy

- High Temperature Geothermal energy is from thermal energy generated and stored in the Earth.
- Thermal energy is the energy that determines the temperature of matter.
- Earth's geothermal energy originates from the original formation of the planet and from radioactive decay of minerals.

Bioenergy

- Biomass is biological material derived from living, or recently living organisms.
- It most often refers to plants or plant-derived materials which are specifically called lignocellulosic biomass.
- Conversion of biomass to biofuel can be achieved by different methods which are broadly classified into: thermal, chemical, and biochemical methods.

Advantages of renewable energy

- Renewable energy won't run out
- Maintenance requirements are lower
- Renewables save money
- Renewable energy has numerous health and environmental benefits
- Renewables lower reliance on foreign energy sources
- Generating energy that produces no greenhouse gas emissions from fossil fuels and reduces some types of air pollution

Disadvantages of renewable energy

- Higher upfront cost
- Intermittency
- Storage capabilities
- Geographic limitations

But Renewable energy has more benefits than drawbacks.

Applications

- Sunlight, or solar **energy**, can be **used** directly for heating and lighting homes and other buildings, for generating electricity, and for hot water heating, solar cooling, and a variety of commercial and industrial **uses**.
- Wind energy, Hydropower etc can be used for electricity production.
- Biomass can be used to produce biofuels.

Thank You