

RENEWABLE ENERGY AND GREEN TECHNOLOGY

ASAE 2203

CLASSIFICATION OF ENERGY SOURCES

- About 70% of India's energy generation capacity is from fossil fuels, with coal accounting for 40% followed by crude oil and natural gas at 24% and 6% respectively.
- Due to rapid economic expansion, India is expected to be the 2nd-largest contributor to the increase in global energy demand by 2035.
- India has the world's 5th largest wind power market and plans to add about 20GW of solar power capacity by 2022.
- India also envisages to increase the contribution of nuclear power to overall electricity generation capacity from 4.2% to 9% within 25 years.

TYPES OF ENERGY

- **Chemical Energy** Chemical energy is the energy stored in the bonds of atoms and molecules. Biomass, petroleum, natural gas, propane and coal are examples of stored chemical energy.
- **Nuclear Energy** Nuclear energy is the energy stored in the nucleus of an atom - the energy that holds the nucleus together. The nucleus of a uranium atom is an example of nuclear energy.
- **Stored Mechanical Energy** Stored mechanical energy is energy stored in objects by the application of a force. Compressed springs and stretched rubber bands are examples of stored mechanical energy.
- **Gravitational Energy** Gravitational energy is the energy of place or position. Water in a reservoir behind a hydropower dam is an example of gravitational energy. When the water is released to spin turbines, it becomes rotational energy.
- **Radiant Energy** Radiant energy is electromagnetic energy that travels in transverse waves. Radiant energy includes visible light, x-rays, gamma rays and radio waves. Solar energy is an example of radiant energy. **Thermal Energy** Thermal energy (or heat) is the internal energy in substances- the vibration and movement of atoms and molecules within substances. Geothermal energy is an example of thermal energy.

- **Electrical Energy** Electrical energy is the movement of electrons. Lightning and electricity are examples of electrical energy. **Motion** The movement of objects or substances from one place to another is motion. Wind and hydropower are examples of motion. **Sound** Sound is the movement of energy through substances in longitudinal (compression/rarefaction) waves.
- **Light Energy** Light energy is a type of wave motion. That is, light is a form of energy caused by light waves. It enables us to see, as objects are only visible when they reflect light into our eyes
- **Nuclear Energy** Nuclear energy is a controversial energy source. It is not a renewable energy source, but because it is a technology not based on fossil fuels many people think nuclear power plants could play an important role in reducing carbon emissions and battling climate change. However, many others feel the risk of accidents and the issues of storing nuclear waste for thousands of years are too significant to warrant the development of this energy source.

Energy can also be classified as :

Renewable energy source:

- Energy sources, which are continuously and freely produced in the nature and are not exhaustible are known as the renewable sources of energy.
- Eg: solar energy, biomass and wood energy, geo thermal energy, wind energy, tidal energy and ocean energy.

Non renewable energy source:

- Non-renewable sources of energy or conventional sources of energy are being accumulated in nature for a very long time and can't be replaced if exhausted. Nature gifted resources which are consumed can't be replaced.
- Eg: coal, petroleum, natural gas, thermal power, hydro power and nuclear power are the main conventional sources of energy.

• Energy resource	• Advantages	• Disadvantages
• Fossil fuels	<ul style="list-style-type: none"> • Provide a large amount of thermal energy per unit of mass • Easy to get and easy to transport Can be used to generate electrical energy and make products, such as plastic 	<ul style="list-style-type: none"> • Nonrenewable Burning produces smog . • Burning coal releases substances that can cause acid precipitation • Risk of oil spills
• Nuclear	<ul style="list-style-type: none"> • Power plants do not produce smog • Very concentrated form of Energy 	<ul style="list-style-type: none"> • Produces radioactive waste Radioactive elements are nonrenewable
• Geothermal	<ul style="list-style-type: none"> • Almost limitless source of energy • Power plant require little land 	<ul style="list-style-type: none"> • Only practical areas near hot spots • Waste water can damage soil
• Biomass	<ul style="list-style-type: none"> • Renewable 	<ul style="list-style-type: none"> • Requires large area of farmland Produces smoke

SOURCES OF RENEWABLE ENERGY

1. Solar Thermal
2. Solar Photovoltaic Energy
3. Biomass Energy
4. Wind Energy
5. Geothermal Energy
6. Hydroelectric power