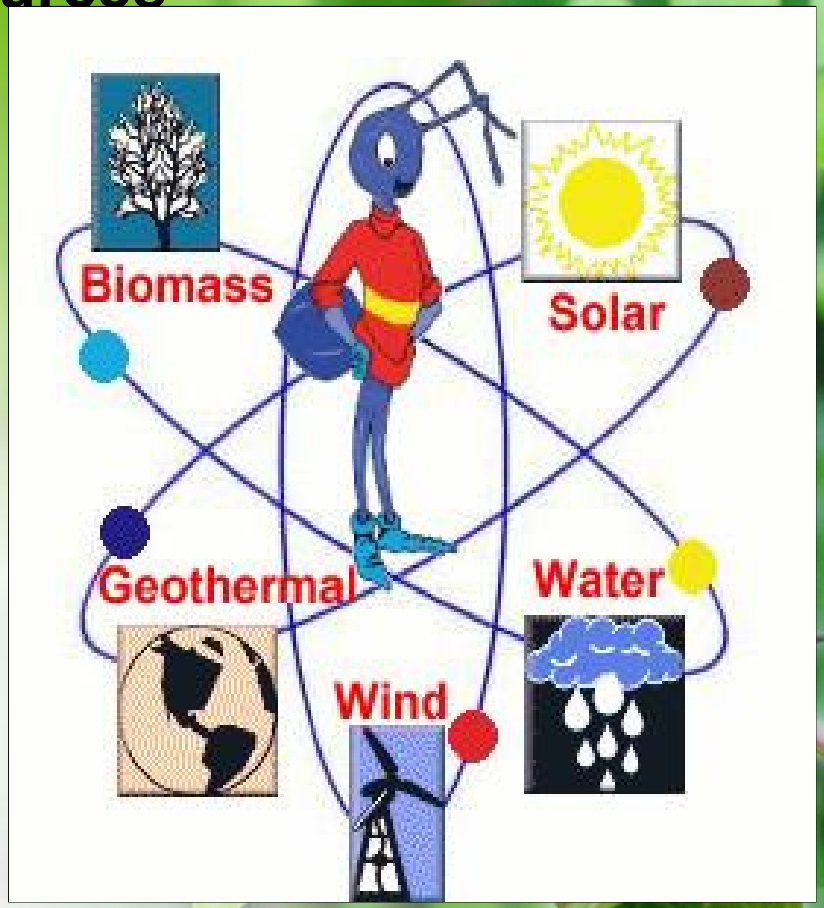
Introduction

- **Major Renewable Energy Sources**
  - **Solar Energy**
  - **Geothermal Energy**
  - **Wind Energy**
  - **Tidal Energy**
  - **Wave Energy**
  - **Hydroelectricity Energy**
  - **Wave Energy**
  - **Biomass**



Introduction

- Renewable Energy – “any sustainable energy source that comes from natural environment.”
- Some Aspects of Renewable Energy
  - It exists perpetually and in abundant in the environment
  - Ready to be harnessed, inexhaustible
  - It is a clean alternative to fossil fuels
  - “energy that is derived from natural process that are replenished constantly” -- defined by the RENEWABLE ENERGY WORKING PARTY of the INTERNATIONAL ENERGY AGENCY

Sustainable energy is the sustainable provision of energy that meets the needs of the present without compromising the ability of future generations to meet their needs. Technologies that promote sustainable energy include ***renewable energy*** sources, such as ***hydroelectricity***, ***solar energy***, ***wind energy***, ***wave power, geothermal energy***, and ***tidal power***, and also technologies designed to improve ***energy efficiency***.

"Energy which is replenishable within a human lifetime and causes no long-term damage to the environment

The Importance Of Sustainable Energy

Sustainable energy is important because of the benefits it provides. The key benefits are:

1. Environmental : Sustainable energy can avoid and reduce air emissions as well as water consumption, waste, noise and adverse land-use impacts.

2. Energy for future generations: Renewables avoid the rapid depletion of fossil fuel reserves and will empower future generations to deal with the environmental impact of over-dependence on fossil fuels.

3. Energy security: Lessens our dependence on fossil and imported fuels.

Renewable energy is energy which comes from natural resources such as sunlight, wind, rain, tides, and geothermal heat.

Solar Energy *- Solar energy is the energy received by the earth from the sun. This energy is in the form of solar radiation, which makes the production of solar electricity possible.*

GEOTHERMAL POWER

power generated using steam produced by heat emanating from the molten core of the earth.

❖Geothermal power is considered to be sustainable because the heat extraction is small compared with the Earth's heat content. The emission intensity of existing geothermal electric plants is on average 122 kg of CO_2 per megawatt-hour (MHh) of electricity, about one-eighth of a conventional coal-fired plant.

WIND ENERGY

wind energy

form of energy conversion in which turbines convert the kinetic energy of wind into mechanical or electric energy that can be used for power.Since wind does not require the use of fossil fuels, it is considered a renewable energy resource

- The advantage of wind turbines

1.They are pollution free.

2.Using wind energy means that less fossil fuel (coal and oil) needs to be burned to make electricity

- The disadvantages of wind turbines

1.spoil the look of the natural environment.

2.Wind turbines make noise.

TIDAL POWER

Tidal power, also called **tidal energy**, is a form of hydropower that converts the energy of tides into useful forms of power - mainly electricity.

- **Advantages of Tidal Energy**

1) It is an inexhaustible source of energy.
2) Tidal energy is environment friendly energy and doesn't produce greenhouse gases.

- **Disadvantages of Tidal Energy**

1) Cost of construction of tidal power plant is high.
2) There are very few ideal locations for construction of plant and they too are localized to coastal regions only.

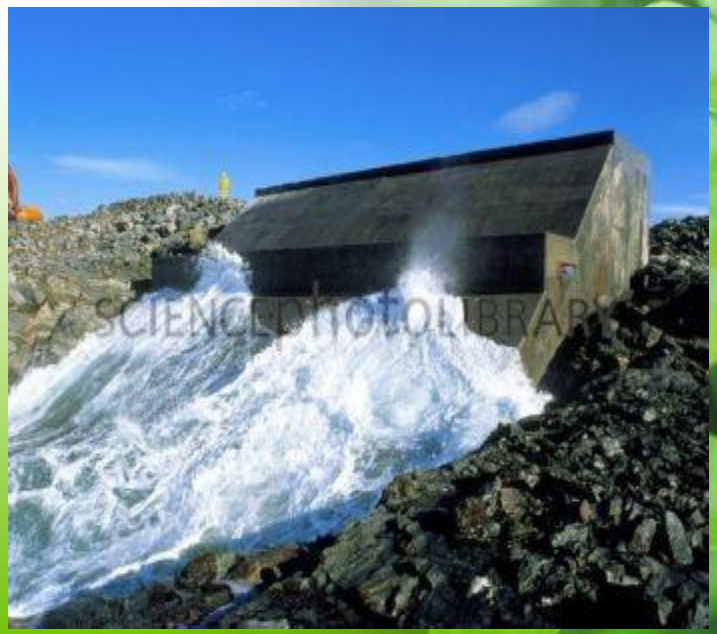
WAVE POWER

Wave power is the transport of energy by ocean surface waves, and the capture of that energy to do useful work.

•**Advantages of Wave Power**

1)Capable of high efficiency (60-80%) in ideal conditions.

2)Renewable energy source obtained by wind via the Sun's heating of our atmosphere.



•**Disadvantages of Wave Power**

1)Improperly placed wave power plants can damage the marine ecosystem.

2)Efficiency drops significantly in rough weather due to safety mechanisms.

HYDROELECTRICITY

HYDROELECTRICITY is a form of Electricity which is produced by water power. For eg: DAMS…

ADVANTAGES:

1. Once a dam is constructed, electricity can be produced at a constant rate.
2 . The lake's water can be used for irrigation purposes.

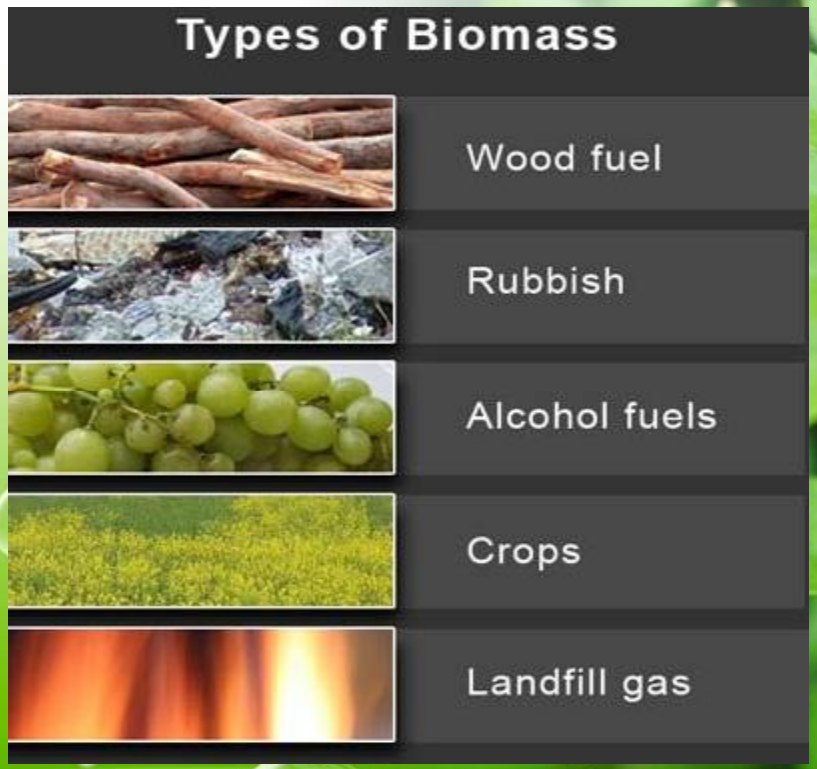
DISADVANATGES:

1. ***Dams are extremely expensive to build and must be built to a very high standard.***

2.The flooding of large areas of land means that the natural environment is destroyed.

BIOMASS

Biomass *- Biomass is the common name for organic materials used as renewable energy sources such as; wood, crops, and waste.*



Energy efficiency

- Moving towards energy sustainability will require changes not only in the way energy is supplied, but in the way it is used, and reducing the amount of energy required to deliver various goods or services is essential.[46]

Smart-grid Technology

- A smart grid is an electrical grid that uses information and communications technology to gather and act on information, such as information about the behaviors of suppliers and consumers, in an automated fashion to improve the efficiency, reliability, economics, and sustainability of the production and distribution of electricity.