



Energy resources

3rd semester/paper code-302

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Energy Resources



ENERGY

Meaning:

- o Energy is the amount of force or power when applied can move one object from one position to another.
- o Energy defines the capacity of a system to do work.
- o Energy exists in everybody whether they are human beings or animals or non living things. e g: Jet, Light, Machines etc..
- o Energy is intimately related to power.

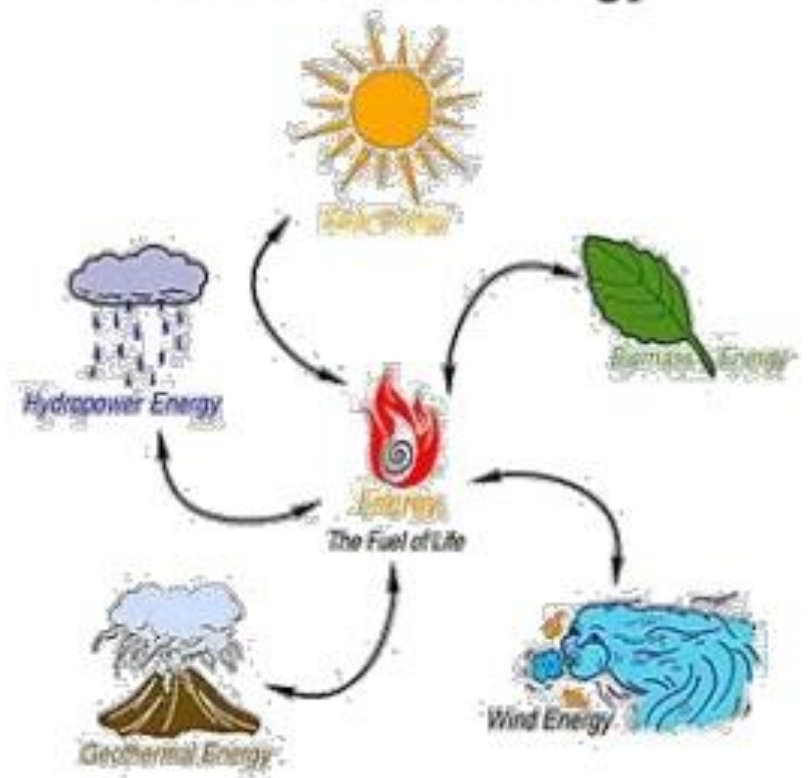
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- o According to the law of conservation of energy, any form of energy can be converted into another form, the total energy will remain the same.
 - o For example: when you charge your mobile phone the electrical energy is converted into the chemical energy which gets stored inside the battery.

Energy and Environment

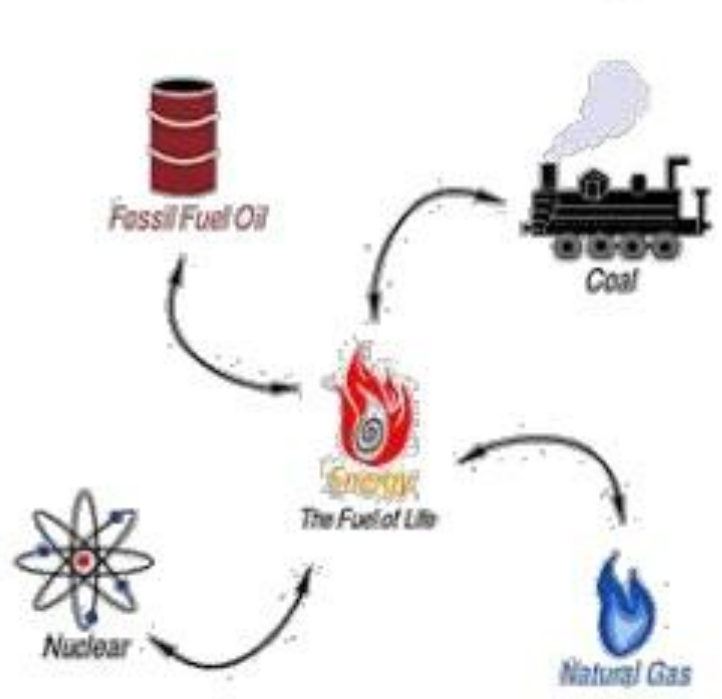
- Energy and environment have a strong relationship. The production and consumption of energy is one of the biggest causes of environmental damage on earth.
- It leads to large amounts of destruction of natural landscapes and habitats through the process of fuel extraction, pollution of soil, climate change, etc.
- Energy is at the heart of many of the world's current environmental problems, and poses many problems for the sustainable development.

CLASSIFICATION

Renewable Energy




Non-Renewable Energy



Renewable Energy

- Renewable energy is energy which is generated from natural sources i.e. sun, wind, rain, tides and can be generated again and again as and when required.
- They are available in plenty and by far most the cleanest sources of energy available on this planet.
- Renewable technologies are suited to
 - large-scale production
 - small off grid applications



□ Main forms of renewable energy

- Wind energy
- Hydro energy
- Solar energy
- Bio-fuel
- Geothermal energy


Wind Power

- Airflows can be used to run wind turbines.
- Areas where winds are stronger and more constant, such as offshore and high altitude sites, are preferred locations for wind farms.
- wind energy is believed to be five times total current global energy production, or 40 times current electricity demand.

- This could require large amounts of land to be used for wind turbines, particularly in areas of higher wind resources. Offshore resources experience wind speeds of ~90% greater than that of land.
- Wind power produces no greenhouse gases during operation, and power is growing at the rate of 30% annually, with a worldwide installed capacity of 157,900 MW.

Solar energy

- Solar energy is the energy derived from the sun through the form of solar radiation.
- Solar powered electrical generation relies on photovoltaic and heat engines. A partial list of other solar applications include day lighting, solar hot water, solar cooking and high temperature process heat for industrial purposes.
- Solar technologies are broadly characterized as either passive solar or active solar depending on the way they capture, convert and distribute solar energy.

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- Active solar techniques include the use of photovoltaic panels and solar thermal collectors to harness the energy.
 - Passive solar techniques include orienting a building to the Sun, selecting materials with favourable thermal mass or light dispersing properties, and designing spaces that naturally circulate air.

Advantages of Renewable resources

- Wide availability
- Lower running cost
- Decentralized power production
- Low pollution
- Available for the foreseeable future

Disadvantages of Renewable Resources:

- Unreliable supply
- Usually produced in small quantities
- Often very difficult to store
- Currently per unit cost of energy is more compared to other types

NONRENEWABLE RESOURCES

- A nonrenewable resource is a natural resource that cannot be re-made or re-grown at a scale comparable to its consumption.
- NUCLEAR ENERGY
- COAL, PETROLEUM, AND GAS
- FOSSIL FUELS

NUCLEAR ENERGY, COAL, PETROLEUM, AND GAS

- Nuclear fission uses uranium to create energy.
- Nuclear energy is a nonrenewable resource because once the uranium is used, it is gone!
- Coal, petroleum, and natural gas are considered nonrenewable because they can not be replenished in a short period of time. These are called fossil fuels.

Advantages of Non-renewable Resources:

- Available in highly concentrated form
- Easy to store
- Reliable supply
- Lower cost per unit of energy produced as the technology is matured

Disadvantages of Non-renewable resources:

- When coal is burnt it produces carbon dioxide that causes global warming.
- Since coal contains impurities like S and N, it produces toxic gases during burning which causes acid rain and air pollution.
- Traces of mercury and radioactive compounds are also released when coal is burned.
- Severe human health threat.(lung disease)