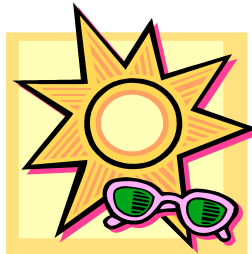


Course Code:MCC102A
Course Title:Environmental Studies

Lecture No: 7
Title: Energy resources
Course Leader : Ms. Priyanka N



Topics

Energy resources: Growing energy needs , renewable and non -renewable energy sources, use of alternate energy sources, case studies.



Intended Learning Outcomes

At the end of this lecture, students will be able to

- Differentiate sources of energy
- Describe the non-traditional sources of energy
- Explain the term land resources

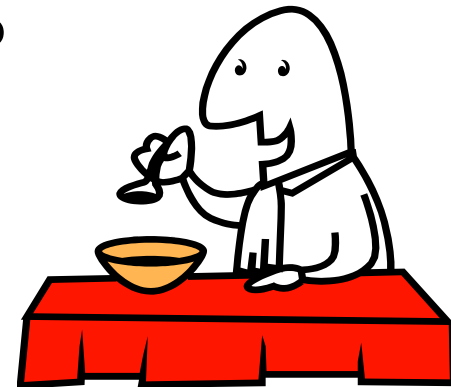


Energy??????

Did you ever skip a meal and find that you were too tired to do much of anything?



Why do our bodies need food?

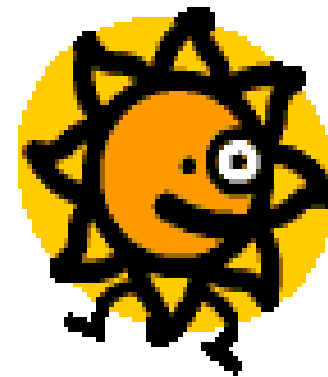


Energy??????

We need food to give us energy.

People are alive, and all living things and natural processes on Earth need energy.

The *main source* of almost all heat and light energy on Earth is the sun!



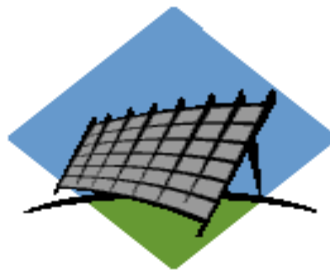
Solar Energy

The sun is an important source of energy



We can use the **sun's natural energy** in many ways.

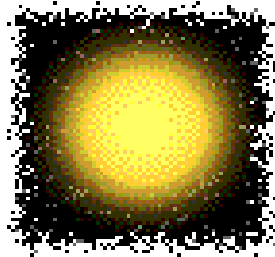
Energy from the sun is called



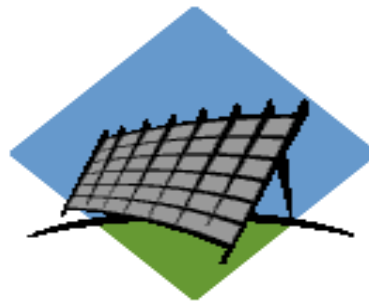
solar energy.

Solar Energy

Solar energy is best used in places that receive a lot of sunlight.



The energy is stored in **solar panels**.



Solar Energy

Solar energy is not the only natural energy resource.



Wind and **water** are also found in nature. They can be used to create energy. **Wind** and **water** are natural resources.

Wind Energy

Wind energy is used to create electricity.



Wind energy can only be used in windy places, like on mountains.

Wind is a **natural resource**. It is found in nature.

Hydro Energy



Water is also used to create electricity.

Water power that is used to create electricity is called **hydroelectric** power.



Hydro Energy

Dams use moving water to make electricity in places where there are large bodies of water.



Oops! Wrong kind of body!



Hydroelectric power can run mills that produce energy.



Fossil Fuels

Fossil fuels are formed from the remains of plants and animals that lived and died long ago.

Over time, the remains of dead plants and animals are changed into energy-rich fuels, called fossil fuels



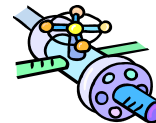
•coal



•petroleum (oil)

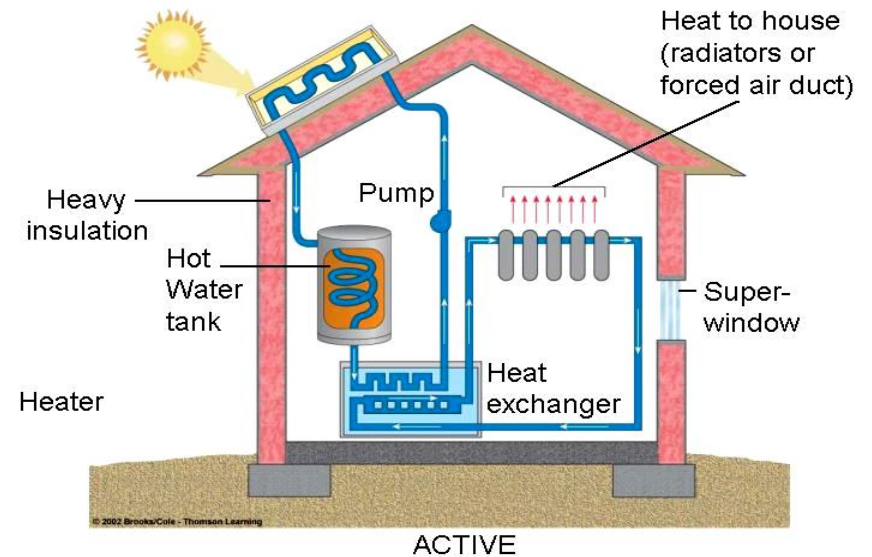
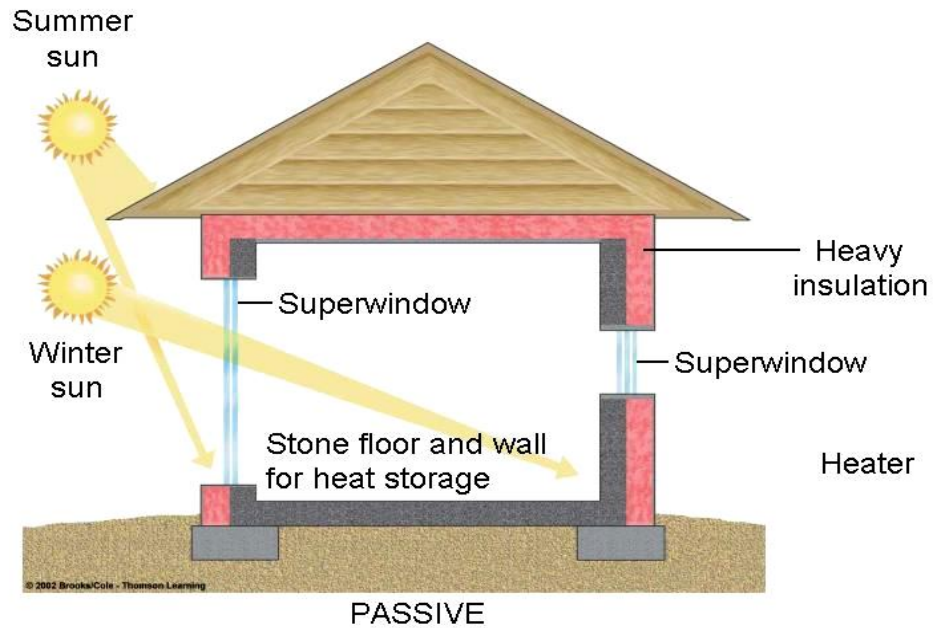


•gasoline

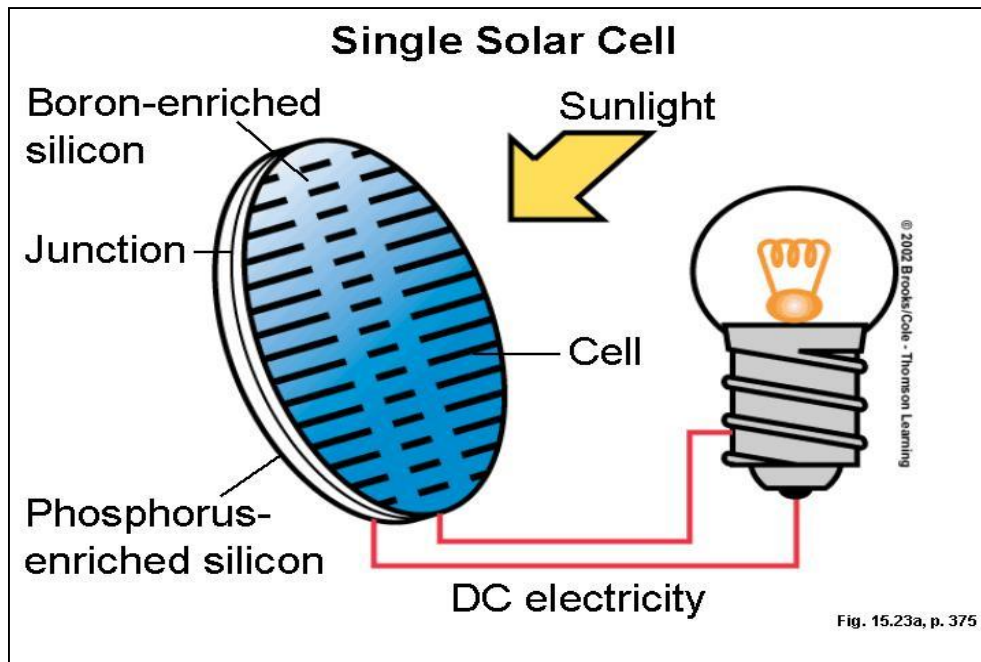


•natural gas

Using Solar Energy to Provide Heat



Using Solar Energy to Provide High-Temperature Heat and Electricity

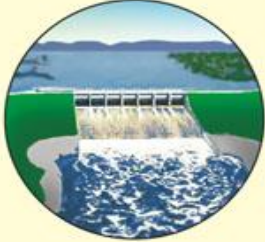




Trade-Offs	
Solar Cells	
Advantages	Disadvantages
Fairly high net energy	Need access to sun
Work on cloudy days	Low efficiency
Quick installation	Need electricity storage system or backup
Easily expanded or moved	
No CO ₂ emissions	
Low environmental impact	
Last 20–40 years	
Low land use (if on roof or built into walls or windows)	
Reduces dependence on fossil fuels	
	High costs (but should be competitive in 5–15 years)
	DC current must be converted to AC

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Producing Electricity from Moving Water

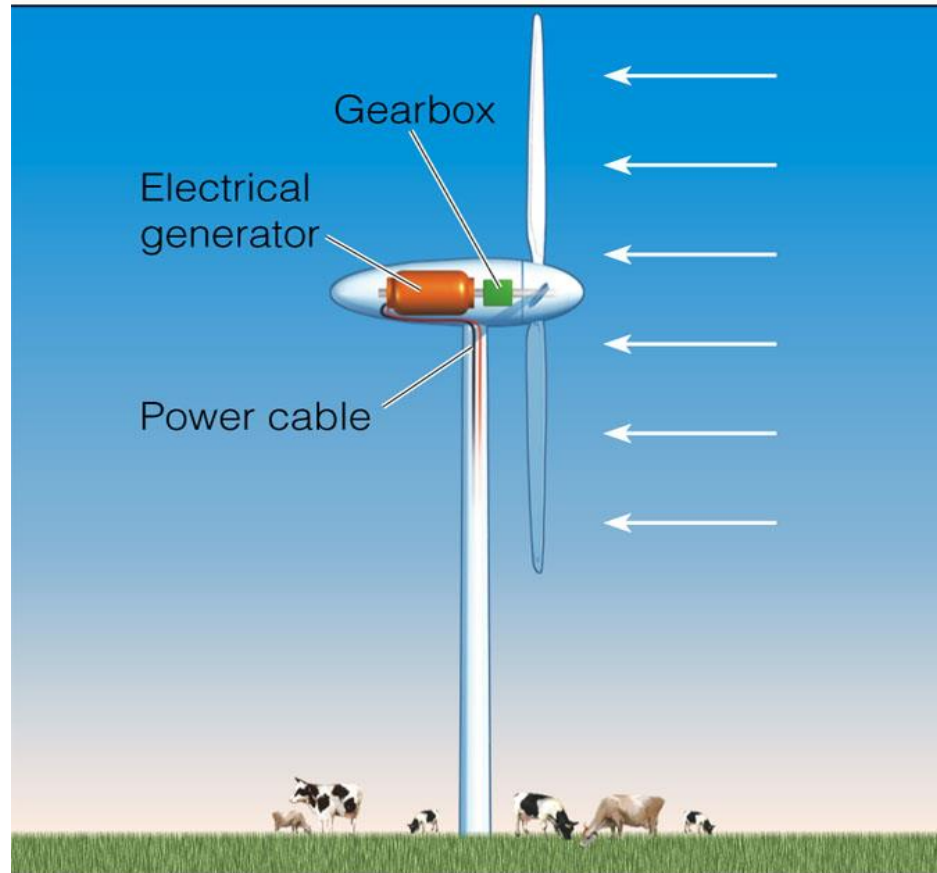
- Large-scale hydropower
- Small-scale hydropower
- Tidal power plant
- Wave power plant

Trade-Offs		
Large-Scale Hydropower		
Advantages		Disadvantages
Moderate to high net energy		High construction costs
High efficiency (80%)		High environmental impact from flooding land to form a reservoir
Large untapped potential		High CO ₂ emissions from biomass decay in shallow tropical reservoirs
Low-cost electricity		Floods natural areas behind dam
Long life span		Converts land habitat to lake habitat
No CO ₂ emissions during operation in temperate areas		Danger of collapse
May provide flood control below dam		Uproots people
Provides water for year-round irrigation of cropland		Decreases fish harvest below dam
Reservoir is useful for fishing and recreation		Decreases flow of natural fertilizer (silt) to land below dam

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Producing Electricity from Wind



Wind turbine

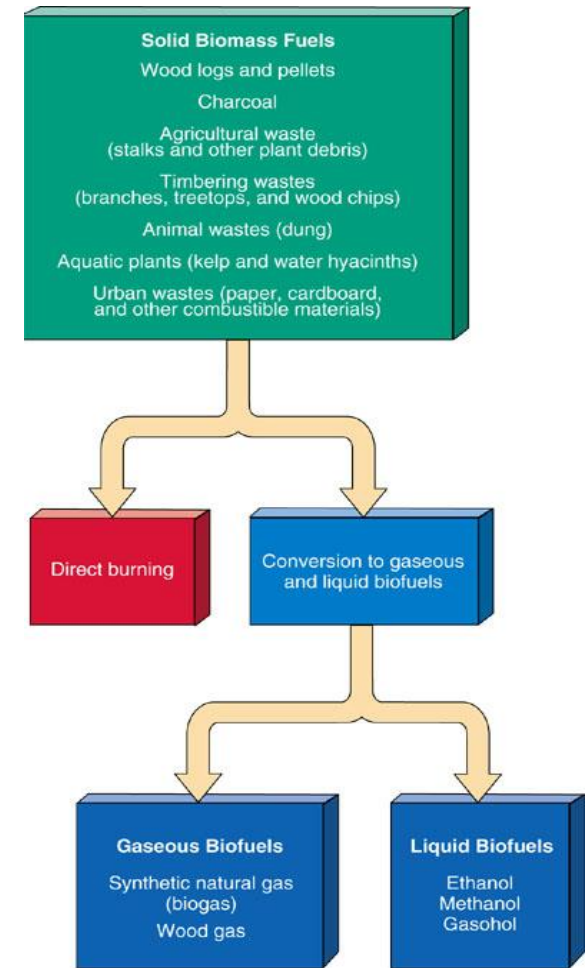
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Trade-Offs	
Wind Power	
Advantages	Disadvantages
Moderate to high net energy	Steady winds needed
High efficiency	Backup systems needed when winds are low
Moderate capital cost	High land use for wind farm
Low electricity cost (and falling)	Visual pollution
Very low environmental impact	Noise when located near populated areas
No CO ₂ emissions	May interfere in flights of migratory birds and kill birds of prey
Quick construction	
Easily expanded	
Can be located at sea	
Land below turbines can be used to grow crops or graze livestock	

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Producing Energy from Biomass

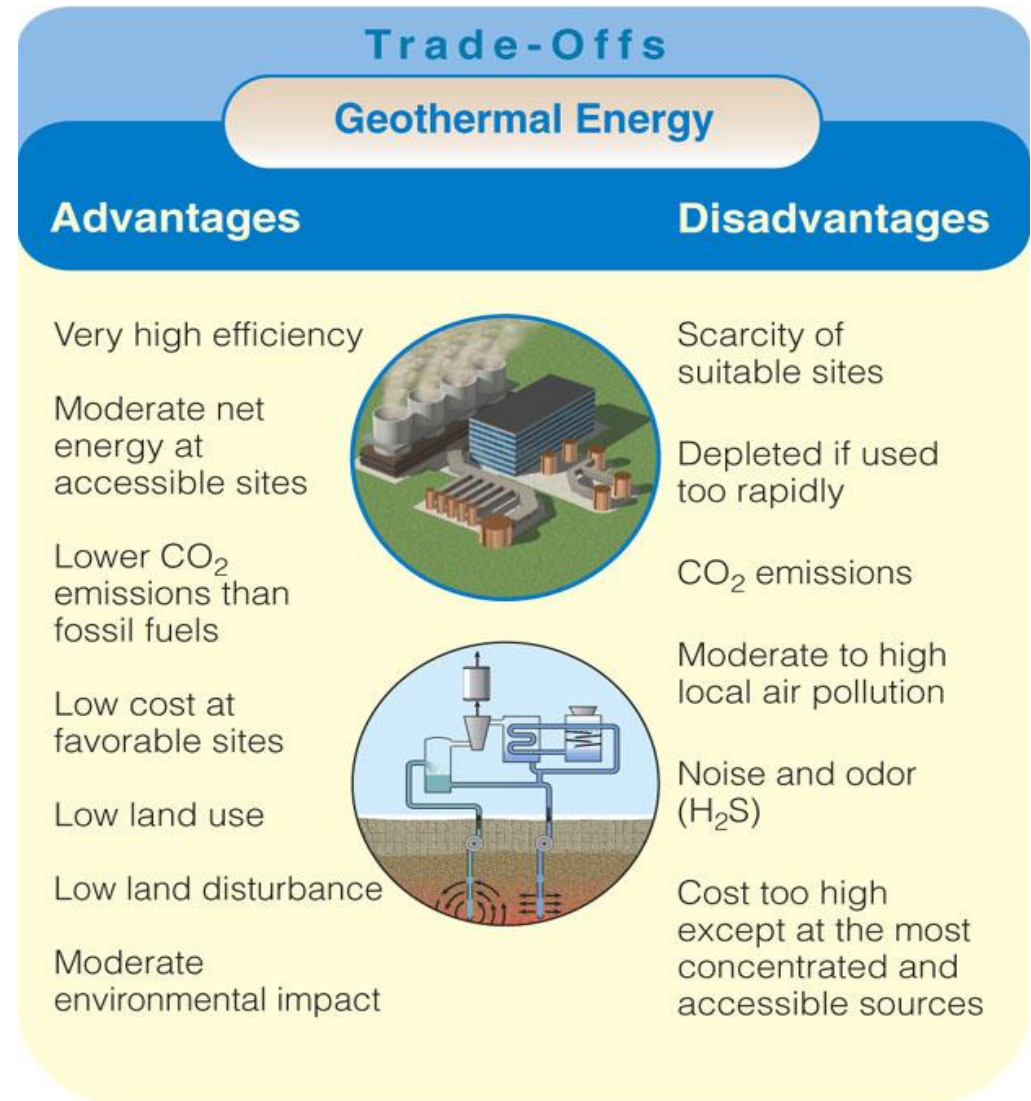
- Biomass and biofuels
- Biomass plantations
- Crop residues
- Animal manure
- Biogas
- Ethanol
- Methanol



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Geothermal Energy

- Geothermal heat pumps
- Geothermal exchange
- Dry and wet steam
- Hot water
- Molten rock (magma)
- Hot dry-rock zones



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Chernobyl – Ukraine (Former USSR)

- April 26, 1986
- One of four reactors explodes.
- 31 immediate deaths.
- 116,000 people evacuated.
- 24,000 evacuees received high doses of radiation.
- Thyroid cancer in children.
- Damaged reactor entombed in concrete, other reactors returned to service within months.
- Eventually, remaining reactors out of service.



Dealing with Nuclear Waste

- High- and low-level wastes
- Terrorist threats – storage casks hold 5-10 X more long-lived radioactivity than the nuclear power plant
- Disposal proposals
 - Underground burial
 - Disposal in space (illegal under international law)
 - Burial in ice sheets
 - Dumping into subduction zones
 - Burial in ocean mud
 - Conversion into harmless materials (no way to do this with current technology)



Land Resources

What we hope to learn from it ?

- ❖ Extent of degradation
- ❖ Availability of food
- ❖ Evaluate Green Revolution
- ❖ Methods of Organic farming
- ❖ Mining menace



Land Resources

Status of our land

- ❖ 23% of usable land degraded

Causes

- ❖ Deforestation
- ❖ Agricultural mismanagement
- ❖ Urbanization
- ❖ Implications
- ❖ Soil erosion
- ❖ Pollution
- ❖ Disturbed natural cycles



Land Resources

Other problems

- ❖ Water logging
- ❖ Soil salinity
- ❖ Desertification
- ❖ In Egypt – 90% farms affected by waterlogging
- ❖ In Pakistan – 66% irrigated land salinized
- ❖ In India – 12-25%



Land Resources

Desertification

- ❖ 1/3 of world land affected
- ❖ 1/5 of world's population threatened
- ❖ Measures to check it
- ❖ UN convention (1994) – 180 countries signed

Can be controlled through

- ❖ Aero-seeding over shifting sand dunes
- ❖ Introduction of salinity tolerant species
- ❖ Early warning system



Land Resources

Urbanization

- ❖ 50% population in Urban areas
- ❖ Big cities - large ecological footprints
- ❖ 2 mha land for waste disposal
- ❖ Urban home gardens – Sao Paulo & Cuba



Summary

- All living things and natural processes on Earth need energy. The main source of almost all heat and light energy on Earth is sun.
- Solar energy is not the only natural energy resource. Wind and water are also found in nature. They can be used to create energy. Wind and water are natural resources.
- Some types of energy are Wind energy, Hydro energy, geothermal energy etc.
- Fossil fuels are formed from the remains of plants and animals that lived and died long ago

