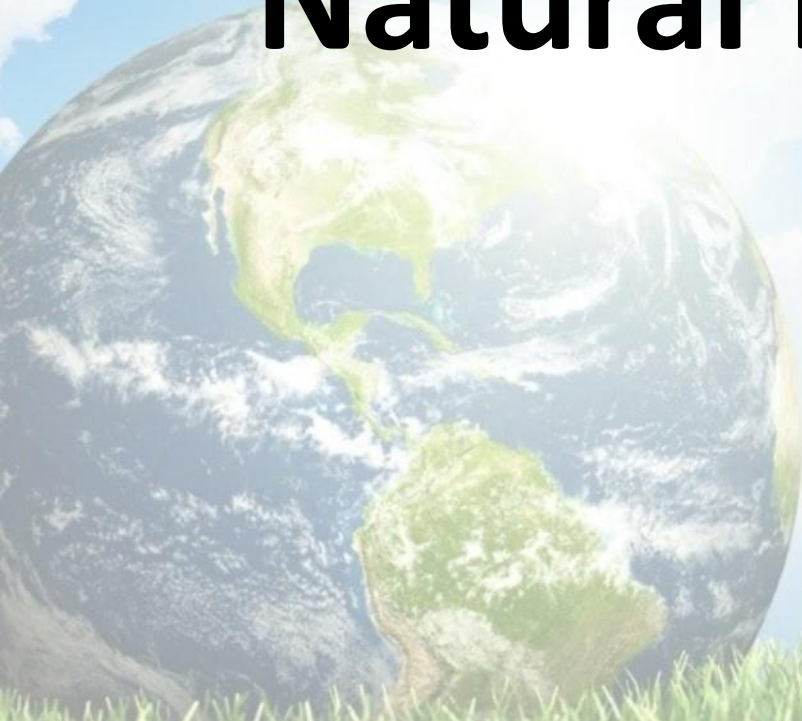


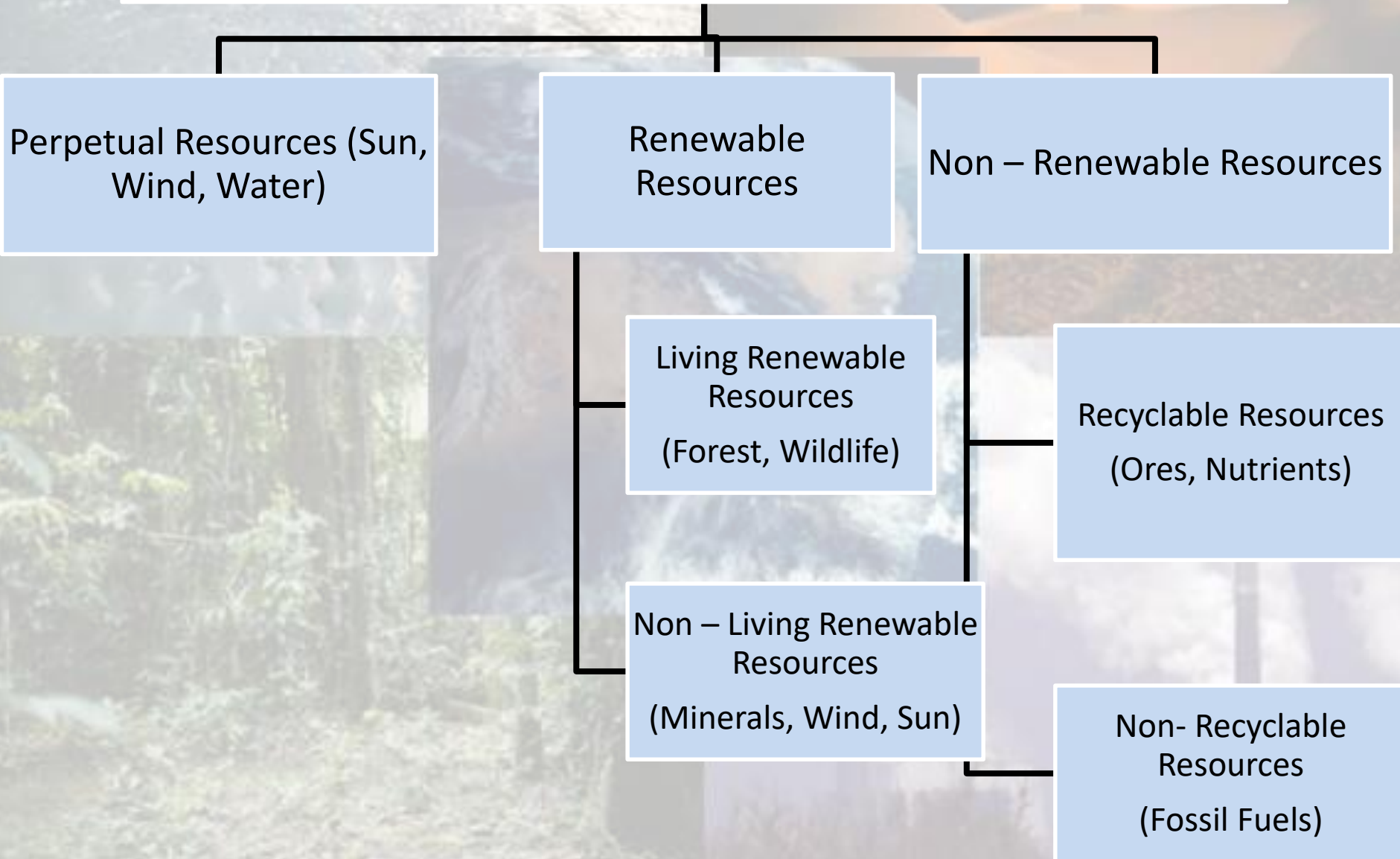
# Environmental Studies

## **Natural Resources**



# Natural Resources

## Natural Resources on Basis of Exhaustibility



# Natural Resources - Classification

- **Perpetual Resources:** These are resources which exist irrespective of the amount of their usage. Example : Sun, wind, Water
- **Renewable Resources:** - The resources which can be renewed and reproduced by physical, chemical or mechanical processes are known as renewable resources.
- **Living Renewable (biological) Resources:** These are those renewable resources which come from living (biotic) sources – like forests, plants.
- **Non-Living Renewable Resources:** These are those that renewable resources which come from non-living (abiotic) sources like land, water, air. Example, metals, minerals, wind, sun etc.
- **Continuous/ Flow Renewable Resources:** These are resources which do not need regeneration. Similar to that of perpetual resources for e.g. Wind Tides etc.



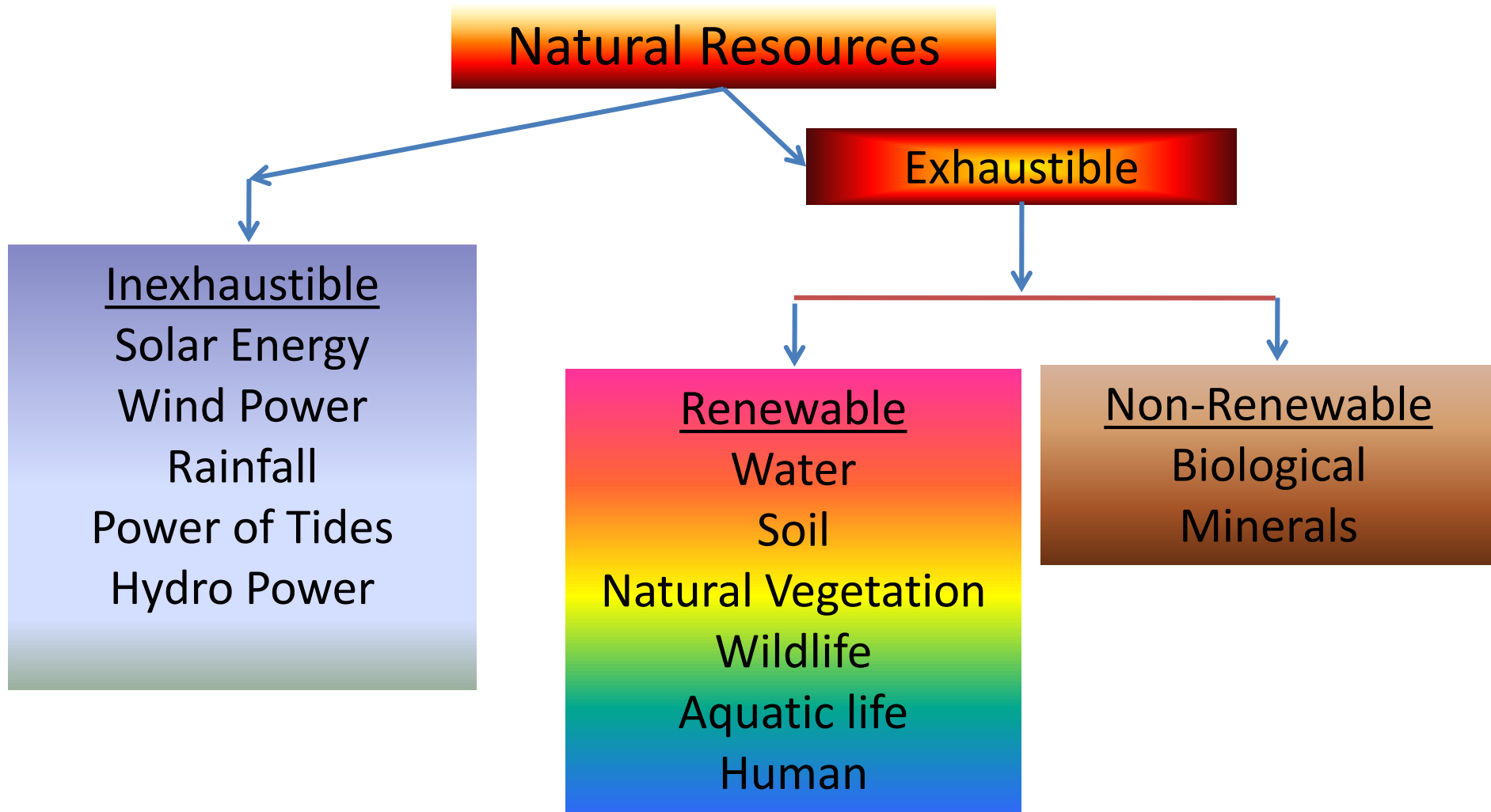
# Natural Resources - Classification

- **Non-Renewable Resources:** These are the resources which require long geological time. Examples of such resources are minerals and fossil fuels. This may take millions of years in their formation. Some of the resources like metals are recyclable and some like fossil fuels cannot be recycled and as such they get exhausted with their use.

These can be further classified as Recyclable and Non-Recyclable resources:

- **Recyclable Resources:** These are those Resources which can be processed to be used again and again. For -e.g. ores of aluminium, copper, mercury etc., deposits of fertilizer nutrients, phosphate rock and potassium and minerals used in their natural state like asbestos, clay, mica etc
- **Non- Recyclable resources:** These are those which once used perish, example coal. These are non-renewable resources, which cannot be recycled in any way. Examples of these are fossil fuels and uranium, which provide 90 per cent of our energy requirements.
- There are a few substances too which can be recycled a few times, before they completely perish or turn non-renewable resources.

# Natural Resources



# Forest Resources - Functions

- Functions of Forest Resources:
  - Productive Function
  - Protective Functions
  - Regulative Function
- Benefits of Forest Resources:
  - Prevent Soil Erosion
  - Increase Soil Fertility
  - Increase Water Table
  - Maintenance of Temp. and Reduce Global Warming
  - Reduce the concentration of CO<sub>2</sub>, Increase O<sub>2</sub>
  - Maintain Bio-Diversity
  - Maintain Nutrient Cycling
  - Aesthetical Benefits
  - Provide Protective Cover for Wildlife
  - Attract Rainfall

# Forest Resources - Deforestation

- Causes of Deforestation
  - Shifting of Cultivation
  - Explosion of Human Population
  - Construction Activities
  - Mining Operations
  - Overgrazing
  - Improper Pests control
  - Forest Fires
  - Dams and Hydroelectric Projects
- Effects of Deforestation
  - Soil Erosion
  - Increase in Climatic Temperature
  - Lowering of Water Table
  - Rise in CO<sub>2</sub> and GHE
  - Disturbance in Hydrological Cycle
  - Decrease in Rainfall
  - Threats of Floods, Droughts and Landslides
  - Decline of Biodiversity

# Forest Resources - Conservation

- Forest Conservation is based on two Basic Principle:
  - Sustainable Supply of Tree Products and services to people and industry
  - Maintenance of long term ecological balance through protection, restoration and conservation of forest cover
- Forest Conservation – Measures:
  - Tree Felling = Tree Planting
  - Special Programs for Tree Plantations (Van Mahotsava)
  - Minimising Waste and Use
  - Pest Control and Control of Forest Fires
  - Implementation of Rules and Regulation
  - Discouraging Cattle Grazing
  - Investigation Environmental Education



# Water Resources - Forms

Forms of Water Resources are:

- Groundwater
- Surface water
- Frozen Water
- De-salinated Water

# Water Resources – Water Stress

Causes of Water Stress are:

- Population Growth
  - Industrialisation
  - Rapid Urbanisation
- Climate Change
- Depletion of Aquifers (Ground Water)
- Water Pollution

# Water Resources – Related Problems

Problems related to water resources are:

- Floods
  1. Urban Flooding - Caused because of Change in surface from porous to rigid
  2. Natural Flooding – Deposition Rivers when it is summer
  3. Flash Flooding – Areas close to coastline – High Tide
- Droughts = Natural Arid Droughts
- Water Crisis = Failure of Infrastructure

# Water Resources – Conservation

Main Approaches for Water Conservation are:

- Increase in Irrigation Efficiency
- Reduction in use and losses
- Recycling of Used Water – Industries, Residential Areas, Commercial Areas Large Institutional Areas
- Rainwater Harvesting – use during monsoon or groundwater recharge – Reduces consumption during monsoon – create water reserve
- Protection of Watershed – Avoiding disposal of untreated water to water bodies, Reducing use of pesticides and fertilizers – Avoiding flooding



# Water Resources – Management

Management Approaches for Sustainable Supply of Water are:

- Construction of Dams and Water Reservoirs – As can create hydro power and improve hydrological cycle in the area
- Desalination of Saline Water – Large Volume Available
- Diversion of Water in drier areas – Hydrological cycle in Arid Areas
- Dredging and De-siltation of Rivers, Streams etc. – to reduce floods

# Water Resources – Dams

## Benefits of Dams are:

- Hydroelectricity Generation
- Ensuring Year Round Supply of Water
- Transfer of Water to the areas of deficit
- Flood Control and Soil Protection
- Irrigation During Dry periods
- Inland Water Navigation

## Problems of Dams are:

- Submergence of Large Areas (Fertile Land)
- Resettlement of displaced people
- Creation of Reservoirs – water logging and problems
- Trigger Seismic activity
- Losses through porous strata and evaporation

# Mineral Resources

There are two methods of Mining:

- Surface Mining (ores are available at shallow depth that is upto 3m from the ground surface level)
  - Open Pit – Dig pits of 1\*1\*1.5 depth
  - Dredging
  - Strip Mining
- Sub-Surface Mining – Tunnelling – Vertical followed by horizontal





# Mineral Resources - Effects

Effects of Mining are:

- De-vegetation and Defacing of Landscape
- Subsidence of Land
- Deforestation
- Soil Erosion
- Barren Land Formation
- Ground Water Contamination – Lead, Arsenic, Chromium etc
- Air Pollution
- Occupational Health Hazards

# Mineral Resources – Social Impacts

The Social Impacts of Mining on Large Scale are:

- Large influx of Habitation
- Additional Burdening on Social Bodies
- Habitant occupying Agricultural Lands
- Disturbance to Local Habitat

# Mineral Resources – Conservation

The methods of Mineral conservation are:

- Reclamation
- Recycling
- Substitution
- More Efficient Use

# Land Resources

The land sources is the life support system – Lithosphere

The causes of Land Degradation are:

- Soil Erosion
- Water Logging
- Salination
- Shifting of Cultivation
- Desertification
- Rapid and Urban Development



# Land Resources - Conservation

The methods of Land Resources Conservation are:

- Conservational Tillage
- Organic Farming
- Crop Rotation
- Contour Ploughing
- Terrace Farming
- Mulching
- Strip Cropping
- Agro-ecological Methods
- Afforestation

# Energy Resources – Non Renewable

The Non Renewable Energy Resources are:

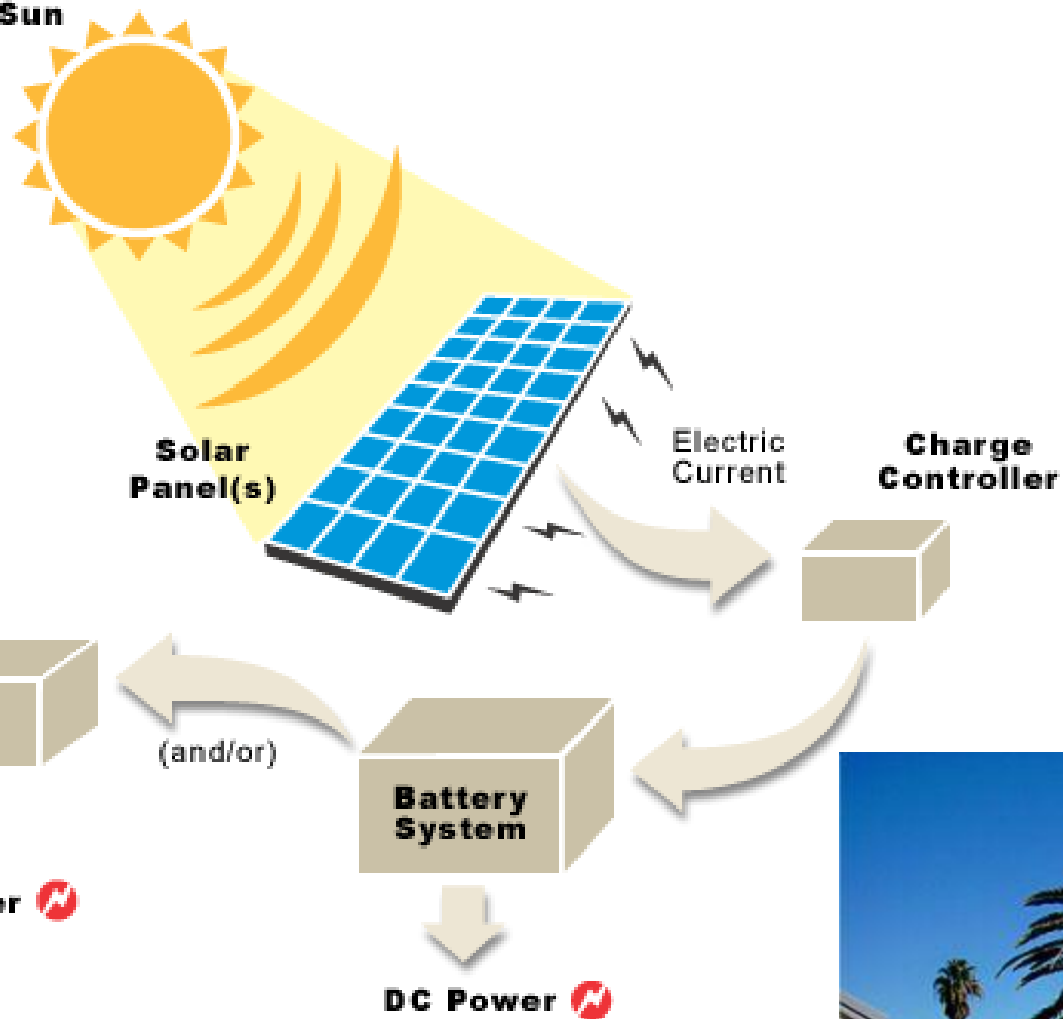
- Fossil Fuels
  - Solid (Coal, Peat)
  - Liquid (Petroleum)
  - Gaseous (LPG)
- Nuclear Energy (Uranium – 235)

# Energy Resources – Renewable

The Renewable Energy Resources are:

- Solar Energy
  - Direct – Thermal or Photovoltaic Conversion
  - Indirect – Biomass Energy (Biogas Plant)
- Hydro-Electric- Energy (Hydropower)
- Geo-Thermal Energy
- Wind Power
- Tidal Energy

**Solar Irradiance  
from the Sun**

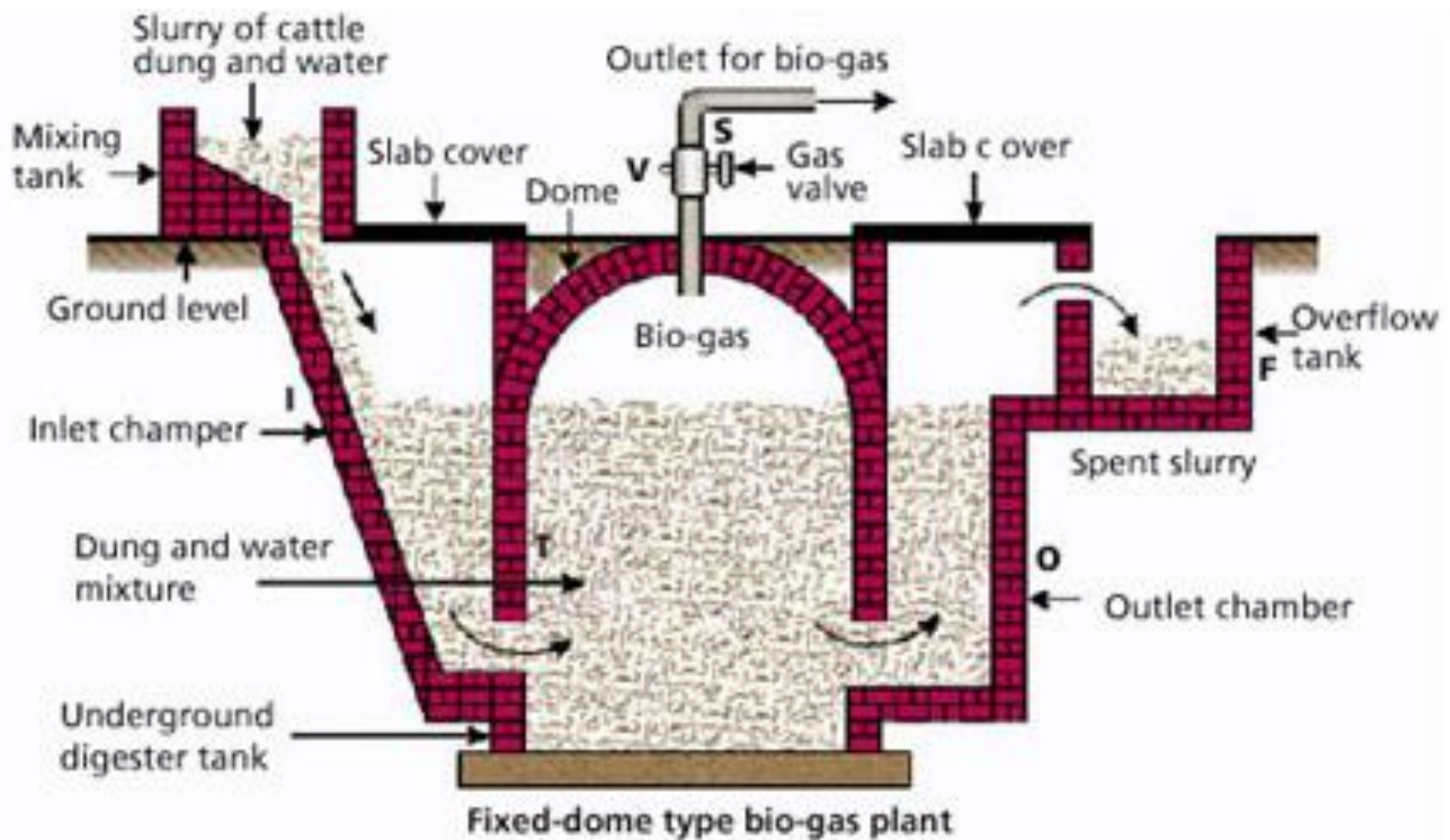


**Solar Energy**



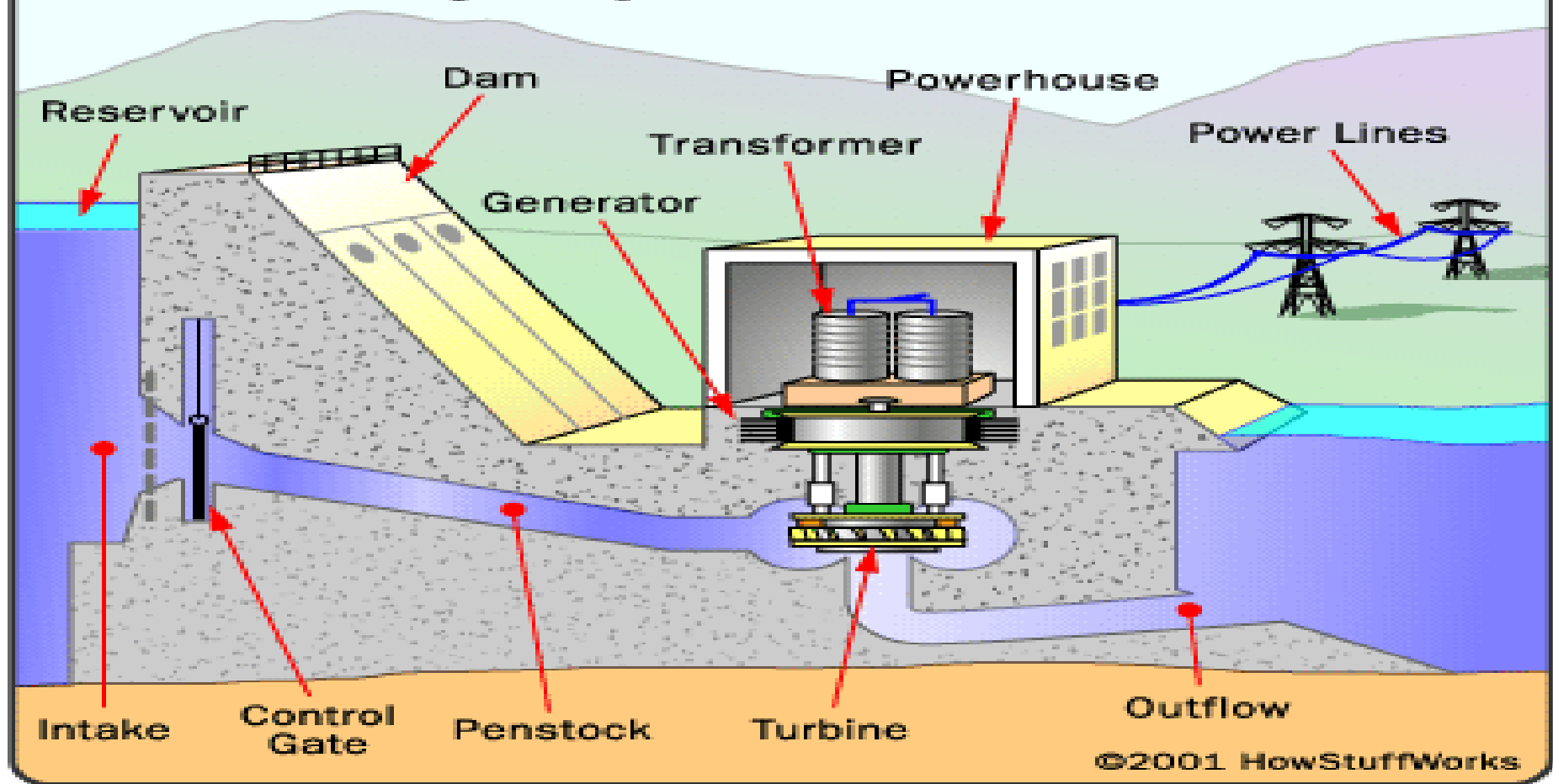






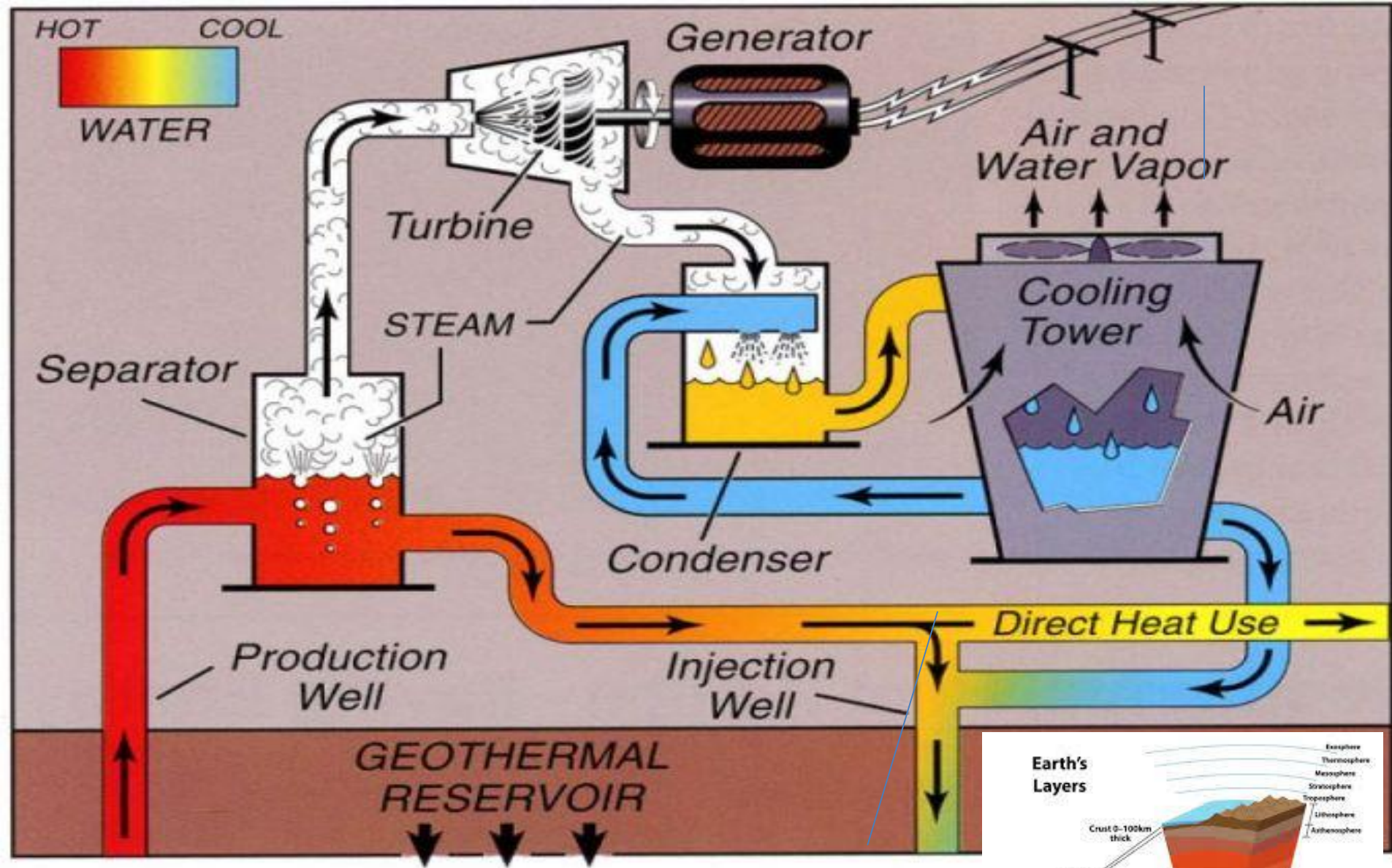
# Biomass Energy – Biogas Plant

# Inside a Hydropower Plant

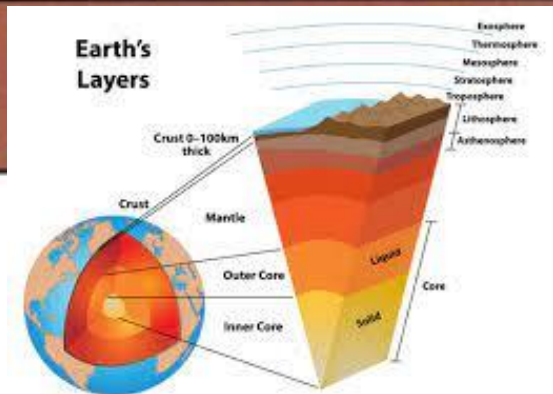


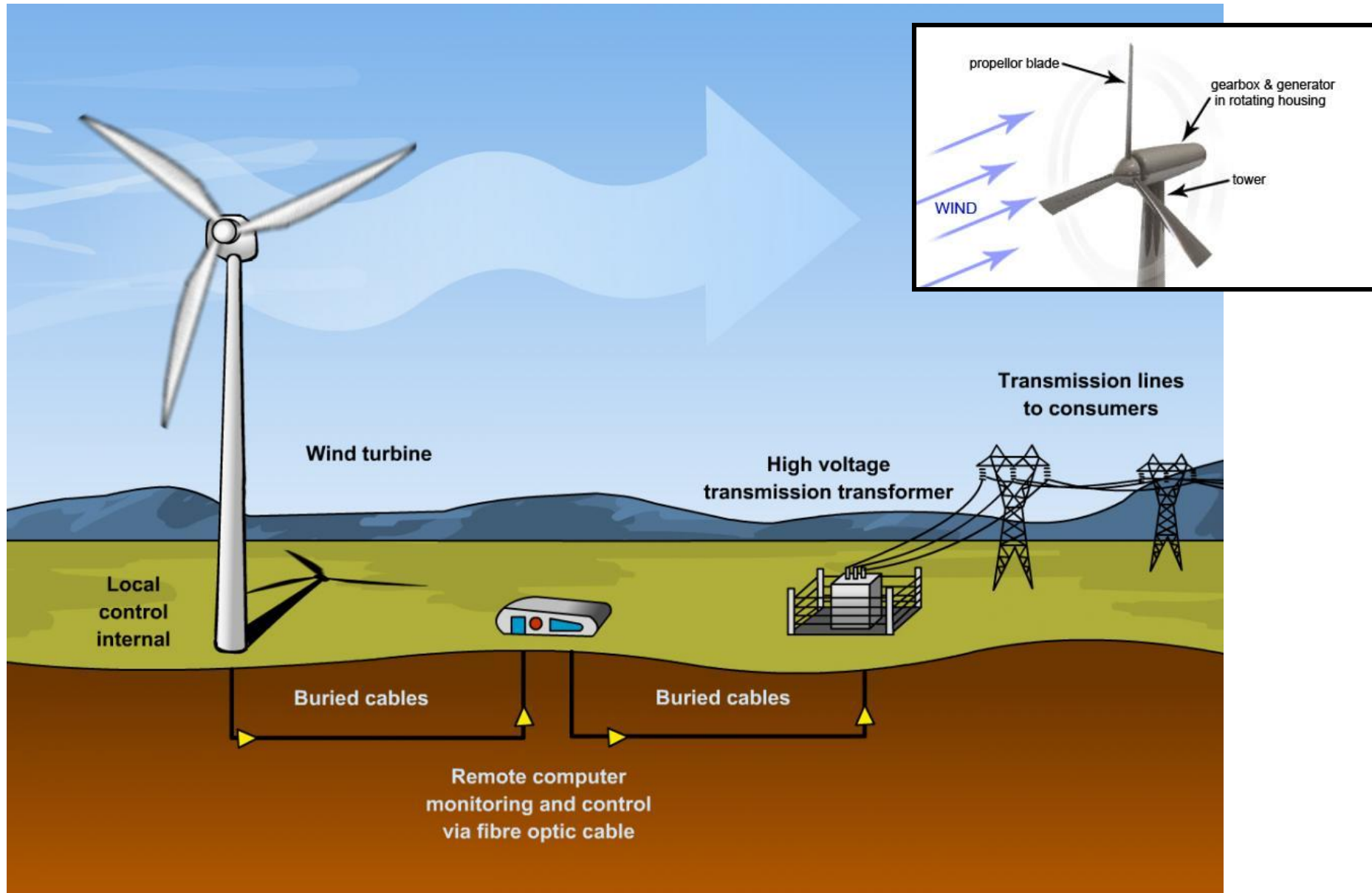
**Hydropower Energy**



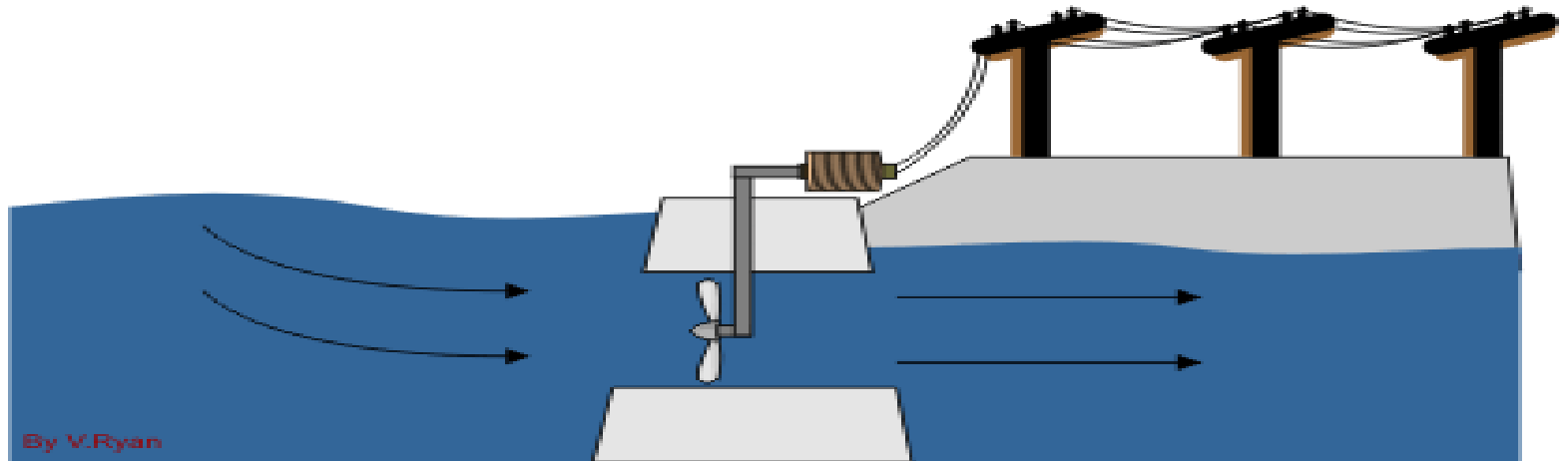


# Geothermal Energy



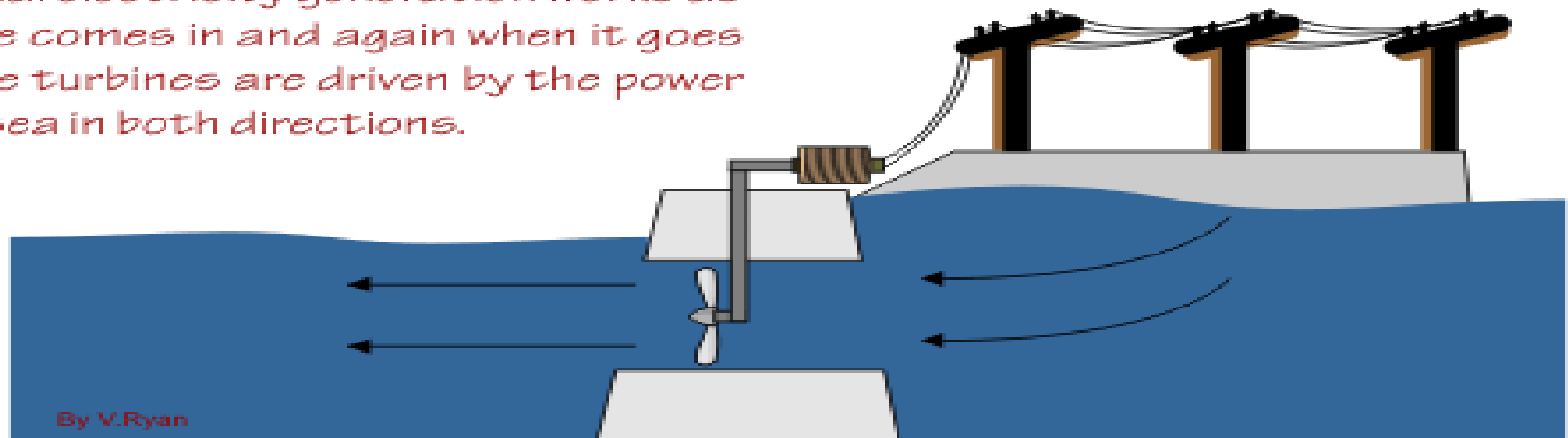


# Wind Power Energy



TIDE COMING IN

*This tidal electricity generation works as the tide comes in and again when it goes out. The turbines are driven by the power of the sea in both directions.*



TIDE GOING OUT

# Tidal Energy