Program – CIVIL ENGINEERING
Program Code – CE

Course- ENVIRONMENTAL STUDIES
Course Code – 22447

08/07/2020

MSBTEs e-content

MSBTE LEAD- STUDY AT YOUR DOORSTEP

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Unit II: Energy Resources

CO 2: Select alternative energy resources for Engineering Practices

UO 2a: List various natural resources.

08/07/2020

Topic: Natural Resources

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What we will learn today?

Learning Objective/ Key takeaways

Students can list various natural resources.

Content

2.1 Natural Resources

1 Forest Resources

2 Water Resources

3 Land Resources

4 Mineral Resources

5 Energy Resources

Concept Map

Natural Resources

What is Resources?

Any thing, which is useful to man, or can be used to produce a useful thing, can be referred as 'resources'.
Example: rocks, minerals, soil, rivers, plants & animal.

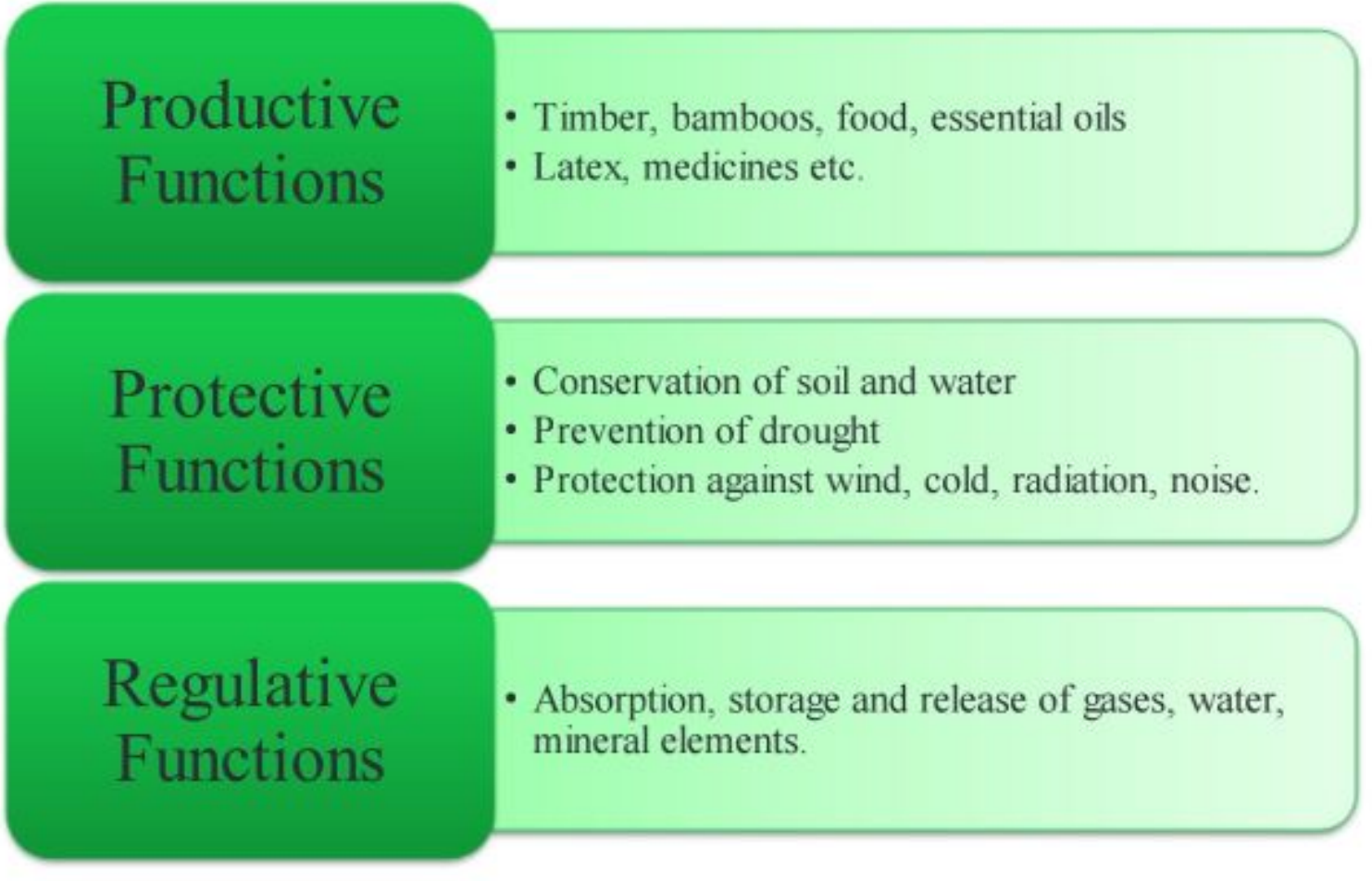
Natural Resources

Resources that are drawn directly from the nature and used without modifications are called Natural Resources.
Eg.: air, water, minerals etc.

1. Forest Resources

- Forest is an area with a high density of trees, together with other plants, covering a large area of land.
- Forests are home to 50% to 90% of earth's species.
- These forests produces innumerable material goods

Functions of forest resources



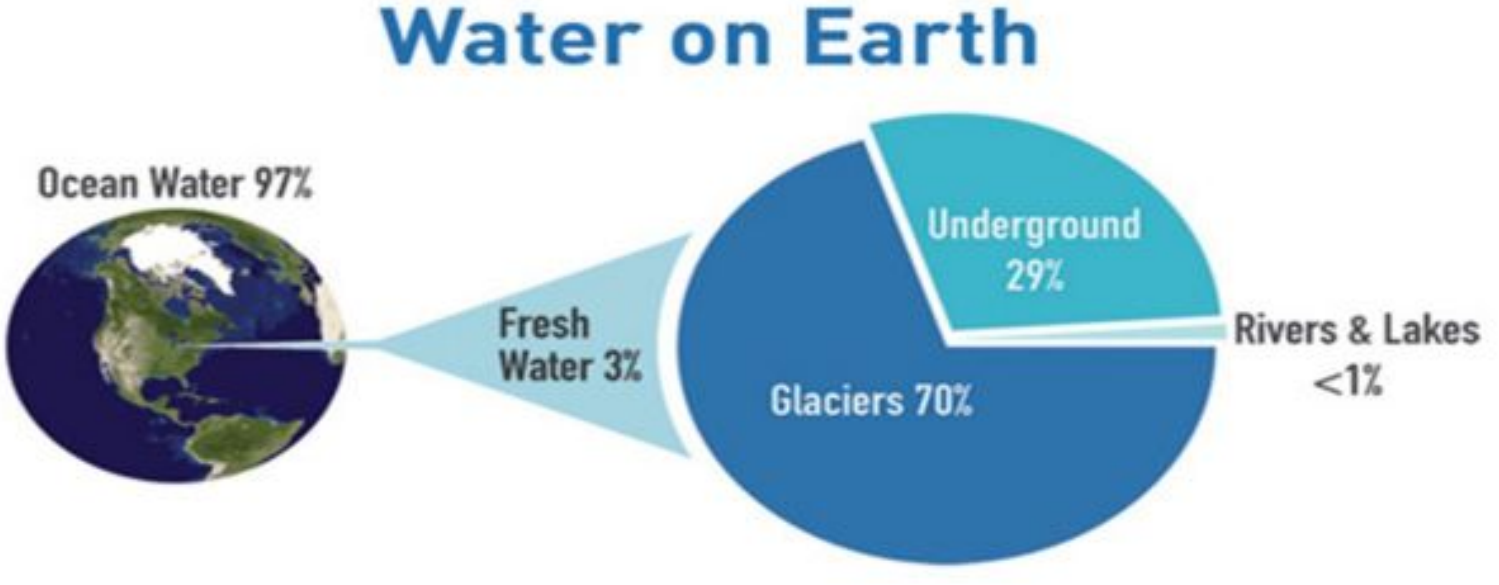
2. Water Resources

- Earth is known as the **"Blue Planet"** because 71 % of the Earth's surface is covered with water.
- About 97% of the earth's water is strong saline.
- The rest 3% is freshwater.

- Fresh Water Sources

1. Glaciers- 70%
2. Underground Water- 29%
3. Rivers and lakes- 1%

- Only 1 % is pure and usable water.



- www.google.com/url?sa=i&url=http%3A%2F%2Fwww.conservationsolutions.com

Importance of Water

- Water is an essential natural resource for sustaining life.
- Water is one of the most important substance on earth.
- If there is no water there would be no life on earth.
- All plants and animals must have water to survive.
- Water is a renewable but limiting resource.

Uses of water

Apart from drinking water have many applications.

Agricultural Uses

Industrial Uses

Household Uses

Recreational Uses

3. Land Resources

- Land is among the most important natural resources. It covers up only 29% of the earth's surface
- Land is a naturally occurring finite resource. It provides the base for survival of living beings. It holds everything that constitutes terrestrial ecosystems.

Uses of Land Resources

1. Agricultural Land: **Agricultural land** is typically land devoted *to* agriculture.

It is land capable of being ploughed and used to grow crops.

2. Habitat for animals and plants:. **Forest** is a **habitat** for many plants and **animals** because it provides a suitable environment for them.

3. Industrial and commercial Area: Commercial area is generally reserved for businesses like offices, retail stores, restaurants etc

Uses of Land Resources

4. Residential Area: **Residential area** means land used as a permanent residence, such as a house, apartment, nursing home, school, child care facility.

5. Waste Disposal Area (Landfills) : **Proper** solid-**waste** collection and disposal is **important** for the protection of public health, safety, and environmental quality.

6. Mineral source:**Mineral** resources are **the** most **important** benefits obtained from land as it accelerate Industrial and economic development of a **country**

4. Mineral Resources

- Minerals are naturally occurring, inorganic, crystalline solids
  With characteristic properties.
- Minerals are exhaustible.

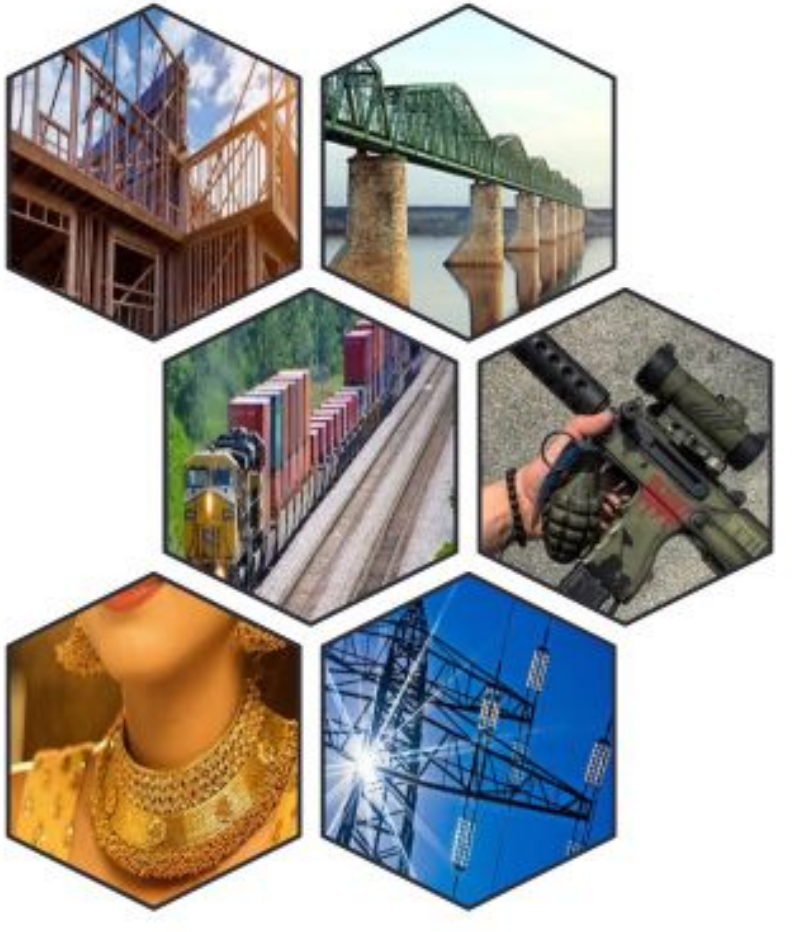
Types of Minerals

1. Metallic minerals – e.g. Bauxite, Hematite, iron, copper, silver, gold etc

2. Non-metallic minerals – e.g.Coal, Limestone, Marble, Granite, sand, stone, salt, phosphates etc

Uses of Minerals

- Development of industrial plants and machinery.
- Generation of energy e.g. coal, lignite, uranium.
- Construction, housing, settlements.
- Defense equipment weapons, armaments.
- Communication- telephone wires, cables, electronic devices.
- Jewellery– e.g. Gold, silver, platinum, diamond.



5. Energy Resources

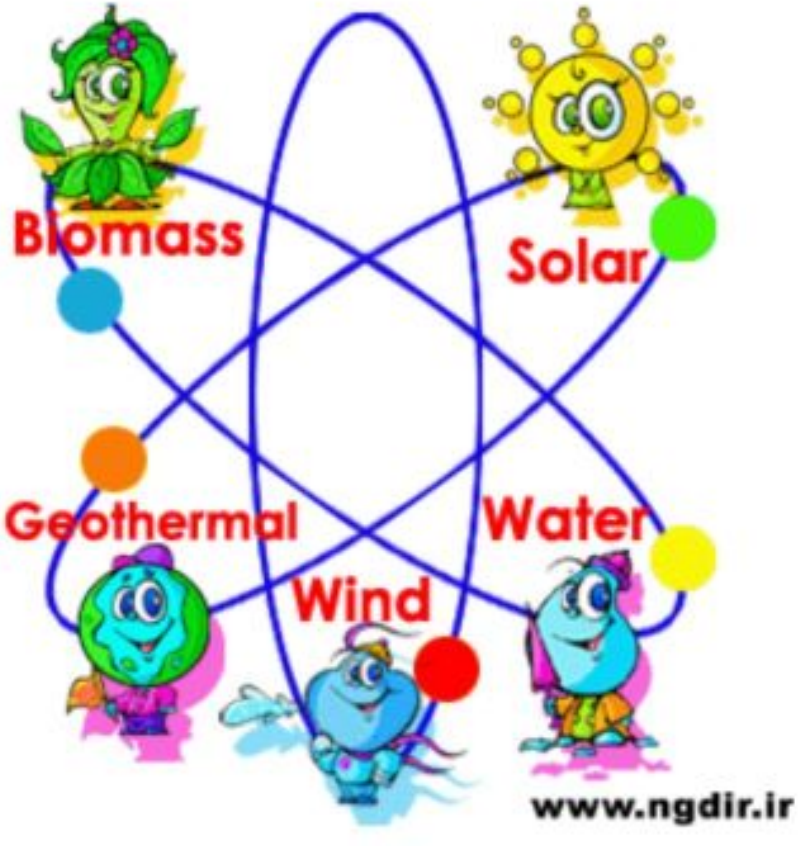
- The substances from which we produce energy are known as energy sources.
- We need energy for our day to day life.
- The energy we use are of two broad categories:

1.Renewable energy

These energy sources are continuously replenished at a constant rate.

2.Non-renewable energy

These sources of energy are known as fossil fuels and these took millions of years to form and cannot be regenerated in a matter of years.



Energy Resources

- **Renewable sources of Energy**

1. Solar power
2. Hydro power
3. Wind energy
4. Tidal energy
5. Geothermal energy
6. Biogas

- **Non-renewable of Energy**

1. Coal
2. Petroleum
3. Natural gas

References:

1. Prof. Erach Bharucha, 2004. Textbook for Environmental Studies. University Grants Commission, New Delhi, India.
2. Dr. Y. K. Singh, 2006. Environmental Science. NEW AGE INTERNATIONAL (P) LIMITED, PUBLISHERS, New Delhi, India.
3. Dr. J. P. Sharma, 2009. Environmental Studies, 2nd Edition, Laxmi publications, New Delhi, India.
4. M.P. Singh, 2005, Environment and Natural Resources Hardcover, Satish Serial Publishing House, Delhi India.
5. R. Rajgopalan, 2011. Environmental Studies: From crisis to cure, Oxford University Press, New Delhi, India.

Natural Resources

The knowledge of Natural resources is very essential to understand the its applications, Global need, and future demands

Once you understand the importance of natural resources,

you will understand the need of its conservation

Summary

We have studied :

Types of Natural Resources

1. Forest Resources
2. Water Resources
3. Land Resources
4. Mineral Resources
5. Energy Resources

Now let's have a Quiz.....

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Unit II: Energy Resources

CO 2: Select alternative energy resources for Engineering Practices

UO 2e: Select appropriate solutions of efficient use of energy.

08/07/2020

Topic: Energy Conservation

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What we will learn today?

Concept Map

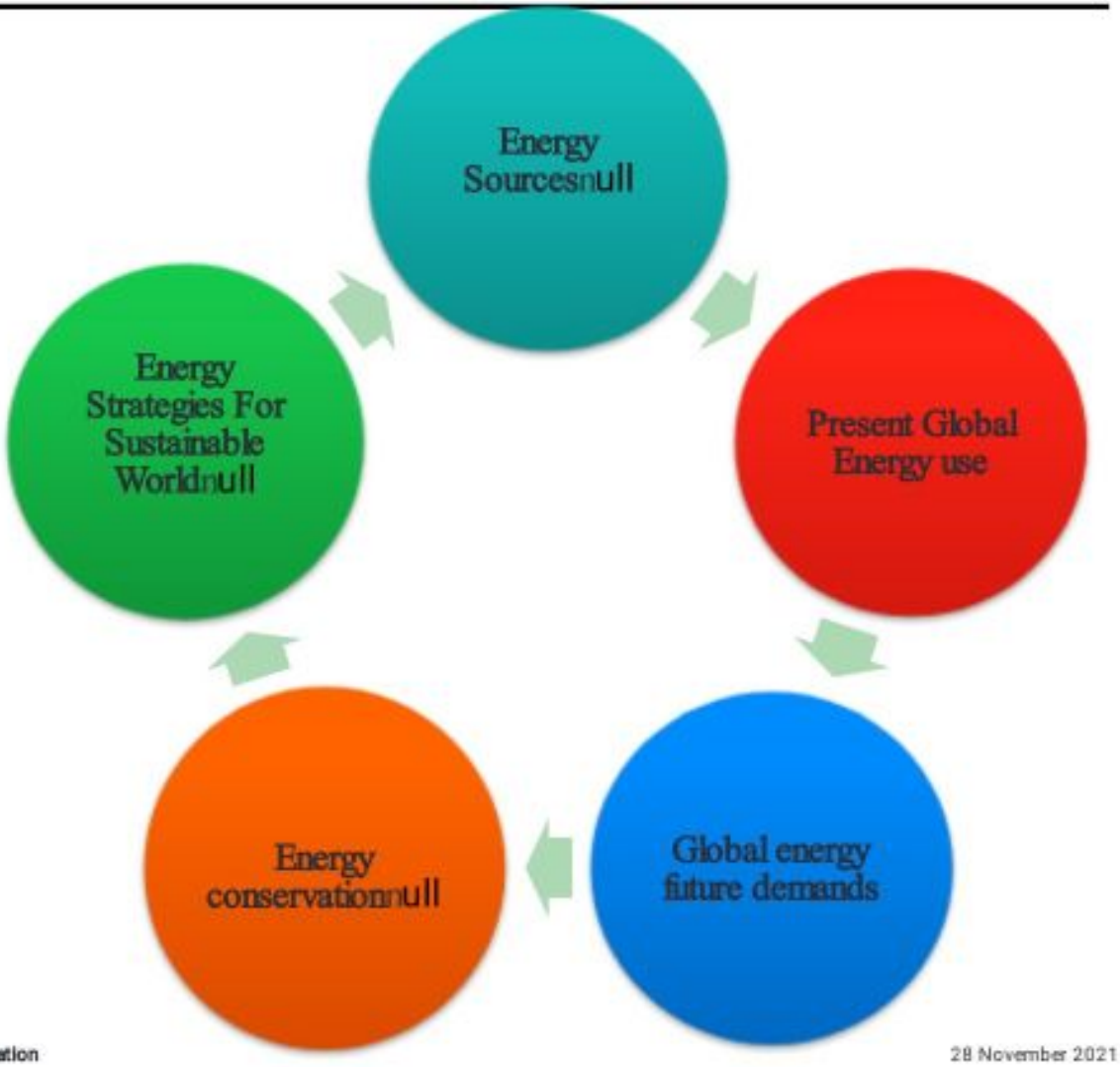
Learning Objective/ Key takeaways

- Knowledge about Global use and future demand of energy
- Understand about various methods of energy conservation

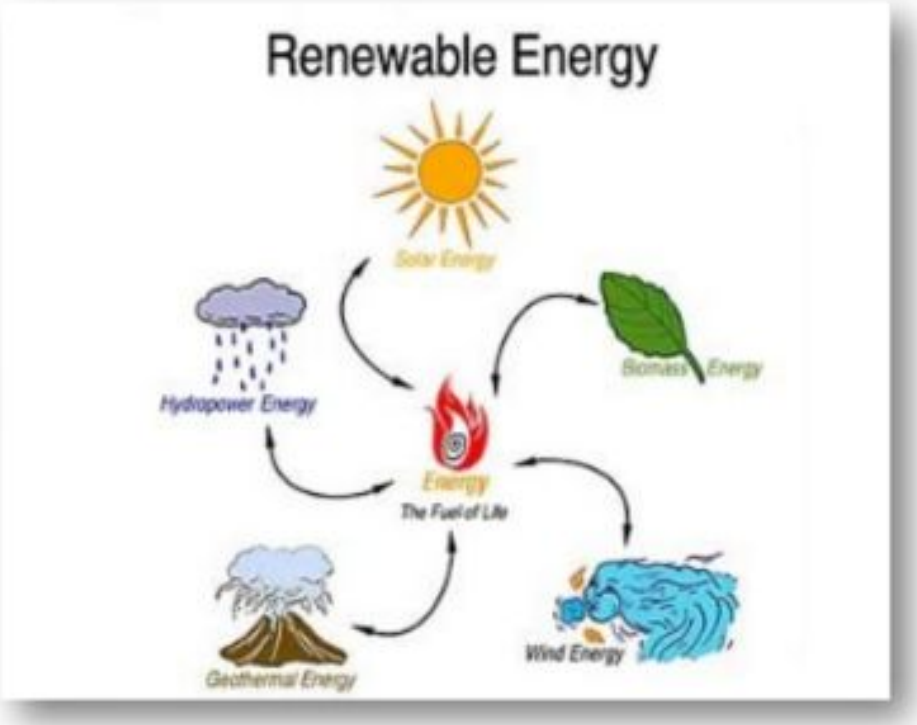
Content

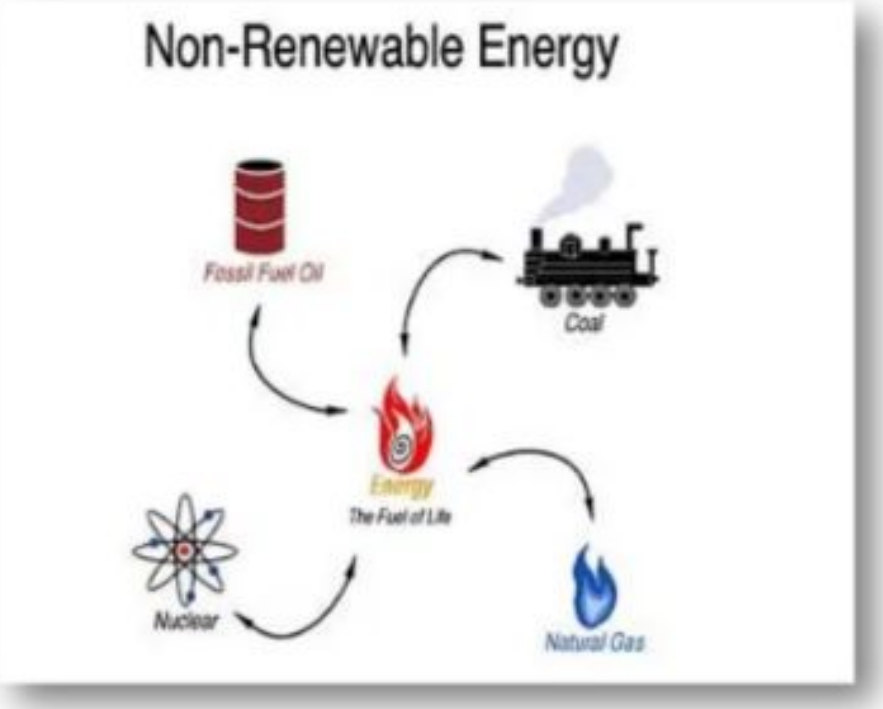
2.5 Present global energy use and future demands

2.6 Energy conservation methods



Main Energy Sources

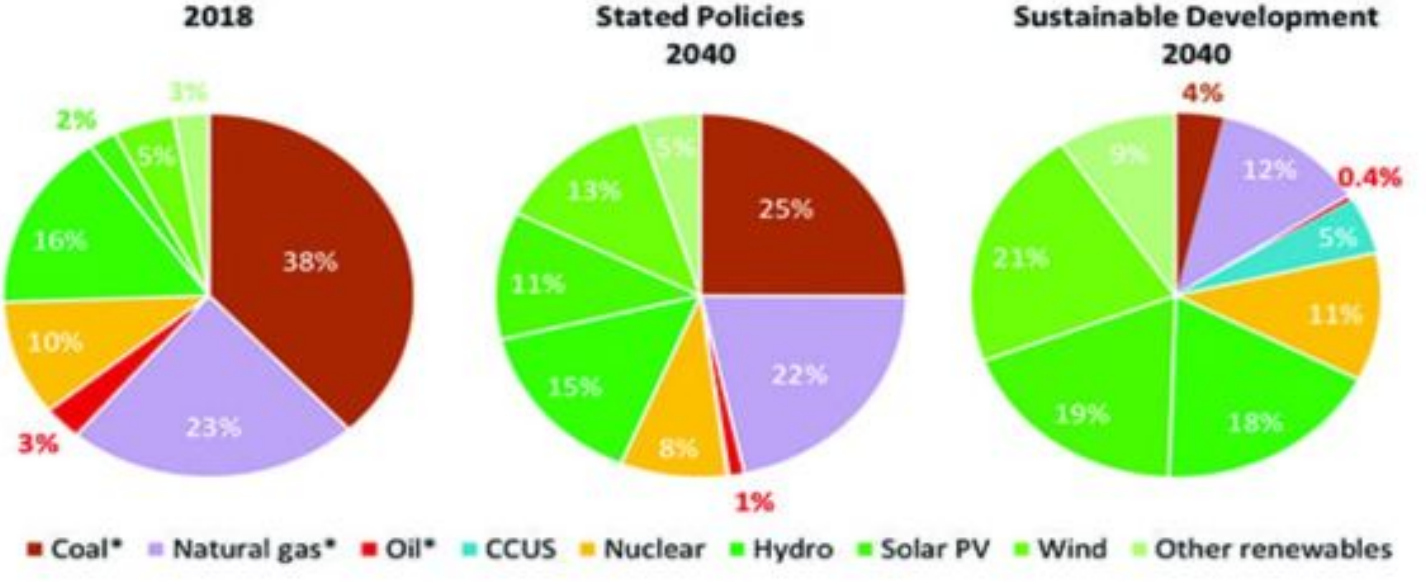




It supplies the energy needed to run the world.

Present Global Energy use:-

- Energy consumption in developing countries is only one-tenth of that in the developed countries.
- Coal and natural gas were the most used **energy** fuels for generating **electricity**.
- The **world's electricity consumption** was 18,608 TWh in 2012.
- In 2018 the total **world energy** came from 64% fossil fuels, 10 % nuclear and 10 % renewable (hydro, wind, solar, geothermal).



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Global energy future demands

- World primary energy demand increase by 1.6% per year on an average.
- The Energy Information Administration (EIA) recently released it latest International Energy Outlook (IEO), its forecast from 2012 out to 2040 is as follows:

1. **Demand of Oil**

- is the most important and most highly consumed source of energy in the world.
- The demand of oil in 2040 will be increase from 85 million barrel to 106 million barrel per day

2. Demand of Coal

- It is the second most abundant source of energy in the world and is highly used in power generation.
- Coal ranks quite low in terms of consumption. Its demand increases to 26 %

https://www.globalenergyinstitute.org/future-global-energy-demand-and-away

Global energy future demands

3. Demand of Natural gas

- It has been the energy source with highest rates of growth in recent years.
- Consumption of gas has increased to 22%.

4. Demand of Renewables:

- The demand for renewable energy will more than double by 2040, largely backing out coal.
- Hydroelectric power will remain the largest single source of renewable energy, accounting for about half of renewable electricity output in 2040.

5. Demand of Nuclear power:

- Nuclear power is forecast to grow 87%.
- Its overall share of demand, however, is expected to move from a bit more than 4% in 2012 to not quite 6% in 2040.

6. Demand of other energy sources

- World electricity demand increase at a rate of 2.5%.
- Transportation energy consumption increases by nearly 40% between 2018 and 2050

https://www.globalenergyinstitute.org/future-global-energy-demand-and-away

Energy conservation

- **WHY TO CONSERVE IT ?**
- We have limited resources available on earth and our demands are continuously increasing day by day.
- It is possible that someday most of the non- renewable resources will be exhausted hence it is necessary to save non-renewable energy resources.
- Energy conservation increases national, personal and financial security

We save our money when we save energy.

We reduce pollution when we save energy

What We Can Do at Personal Level?

- **At Home**

• We should not keep lights unnecessarily switched on.

• Reduce the energy your appliances consume by analysing star ratings.

• Improve your water heating efficiency to reduce energy costs.

- **At Public Places**

• Switch off the fans and lights in the places like bus terminal and railway stations when not necessary.

• Switch off the street lights.

• Big Hoardings, lightened up for the whole evening and nights are other wastage of power which can be and should be avoided

What We Can Do at Global Level?

Energy Strategies For A Sustainable World

- **Necessary condition for socio-economic change to lead to a sustainable world must include:**

- Satisfaction of basic needs of the peoples
- Economic viability
- Self reliant interdependence of nations
- Harmony with the environment

- **Energy strategies for future can be classified as:**

1. Immediate
2. Mid-term
3. Long term

Energy Strategies For A Sustainable World

- **Immediate term strategy:**

• Optimum utilization of existing assets.

• Efficiency in production system & reduction in distribution losses.

• Promoting R&D, transfer and use of technologies for environmentally sound energy systems.

• Rationalizing Tariff structure of all energy products.

- **Medium-term strategy:**

• Demand management through conservation of energy, structural changes in economy, model mix in transportation sector, recycling

• A shift to less energy-intensive modes of transport

• Shift to renewable sources of energy.

Energy Strategies For A Sustainable World

- **Long – term strategy**

• Efficient generation of energy resources.

• Improving energy infrastructure

• Creation of urban gas transmission and distribution network.

• Improving energy efficiency in accordance with national, socio-economic & environmental priorities.

• Promoting of energy efficiency & emission standards.

• Programs for adopting energy efficient technologies in large industries.

• Deregulation and privatization of energy sector

• Streamlining approval process for attracting private sector participation in power generation, transmission & distribution.

References:

1. Prof. Erach Bharucha, 2004. Textbook for Environmental Studies. University Grants Commission, New Delhi, India.
2. Dr. Y. K. Singh, 2006. Environmental Science. NEW AGE INTERNATIONAL (P) LIMITED, PUBLISHERS, New Delhi, India.
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5. R. Rajgopalan, 2011. Environmental Studies: From crisis to cure, Oxford University Press, New Delhi, India.

Energy Conservation

- Energy is needed for each and every work so its conservation is also important.

The different forms of energy are the driving force of todays technology world. So its proper use is a our Global responsibility

Summary

We have studied :

- Present global energy use
- Future demands of energy
- energy conservation for a sustainable world

Now let's have a Quiz.....

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Unit II: Energy Resources

CO 2: Select alternative energy resources for Engineering Practices

UO 2d: State advantages and disadvantages of forms of energy.

08/07/2020

Topic: Energy Forms

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What we will learn today?

Learning Objective/ Key takeaways

List advantages and disadvantages of various energy forms

Contents

2.4 Energy Forms

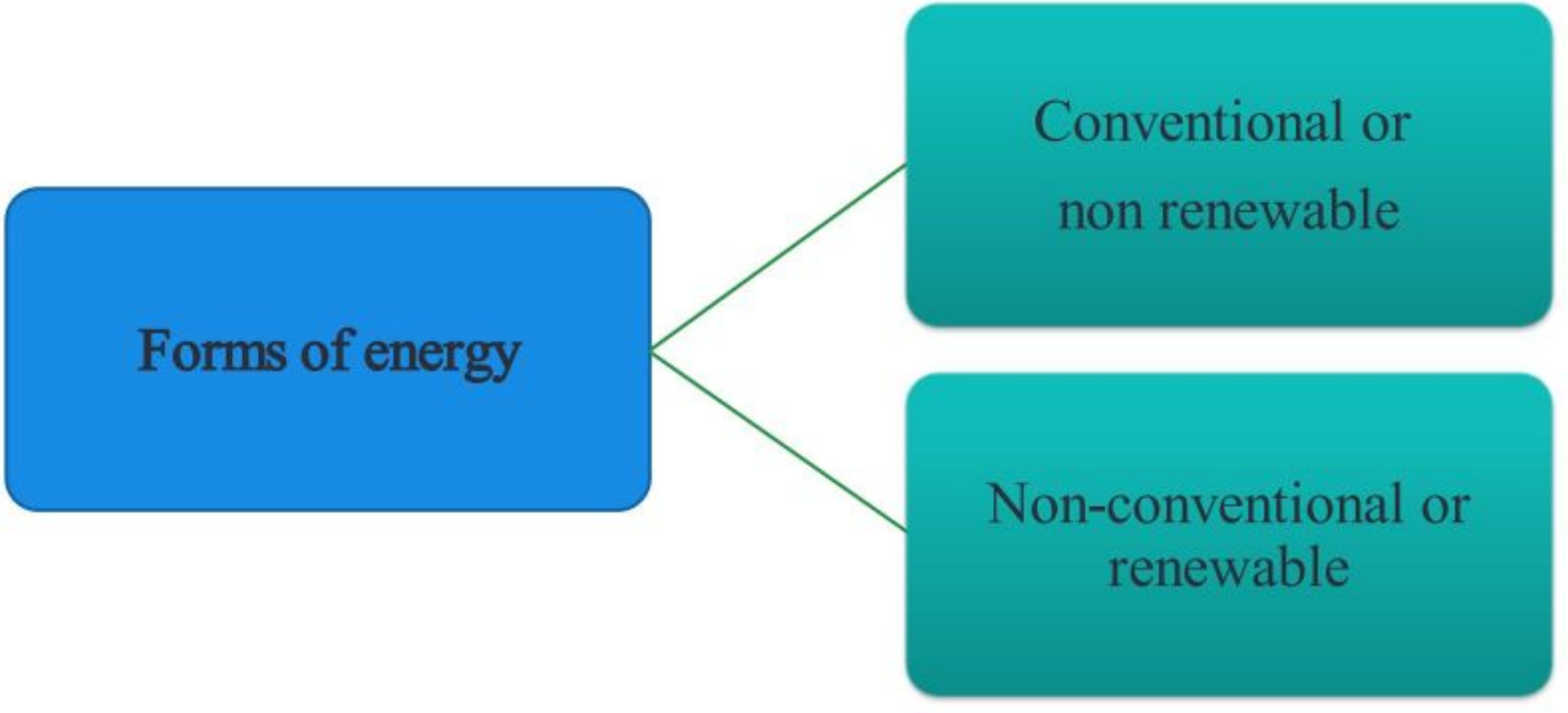
1 Conventional form of energy

- Advantages
- Disadvantages

2 Non-conventional form of energy

- Advantages
- Disadvantages

Concept Map



Examples of Forms of energy

There are two forms of energy –

1. Conventional or non renewable form of energy
   - Thermal energy
   - Nuclear energy

2. Non-conventional or renewable form of energy
   - Solar energy
   - Wind energy
   - Tidal energy
   - Geo thermal energy
   - Biomass energy
   - Hydro power energy

Conventional form of energy -

THERMAL ENERGY

- Thermal energy refers to the energy contained within a system that is responsible for its temperature.
- Heat is the flow of thermal energy from high temperature to low temperature.

Footnotes

Conventional form of energy

ADVANTAGES OF THERMAL ENERGY	DIS-ADVANTAGES OF THERMAL ENERGY
➤ It is one of the most abundant energy sources ➤ It is inexpensive compared to other energy sources ➤ It can lower overall amount of greenhouse gases (liquefaction or gasification) ➤ It is Leading source of electricity today ➤ By-product of burning (ash) can be used for concrete and roadways.	➤ Source of pollution: emits waste, SO_2, Nitrogen Oxide, ash ➤ Physical transport is difficult ➤ Technology to process coal into liquid or gas is not fully developed ➤ Solid is more difficult to burn than liquid or gases ➤ Dirty industry—leads to health problems ➤ Fossil fuels create more pollution and emissions

Footnotes

Conventional form of energy

NUCLEAR ENERGY

- Nuclear power, or nuclear energy, is the use of exothermic nuclear processes, to generate useful heat and electricity.
- The term includes nuclear fission, nuclear decay and nuclear fusion.

Footnotes

Conventional form of energy

ADVANTAGES OF NUCLEAR ENERGY	DIS-ADVANTAGES OF NUCLEAR ENERGY
➤ It provides clear power with no atmospheric emissions ➤ Its fuel can be recycled ➤ It gives low cost power for today's consumption ➤ It is viable form of energy in countries that do not have access to other forms of fuel	➤ It has potential of high risk / disaster (Chernobyl) ➤ It has waste disposal problems. ➤ Waste produced from it is of no use. ➤ Earthquakes can cause damage and leaks at plants. ➤ It leads to contamination of the environment (long term) ➤ Lifetime of a nuclear power plant is limited

Non-Conventional form of energy

SOLAR ENERGY

- Solar energy is obtained from the sun by capturing the solar radiation and converting it into another form of energy for performing various activities
- The conversion of solar energy into thermal energy can be done by using solar collectors.

Footnotes

Non-Conventional form of energy

ADVANTAGES OF SOLAR ENERGY	DIS-ADVANTAGES OF SOLAR ENERGY
❑ Solar energy is clean, noise free and renewable form of energy which causes no pollution ❑ Very little maintenance is required to keep solar cell running as there are no moving parts in it. ❑ In the long run it can give high return on investment due to the amount of free energy, solar panels produced	❑ Electricity generation depend entirely on exposure to sun light which has limitation by climate ❑ Solar power stations can be very expensive to build. ❑ Solar power is used for charging batteries so that it can be used at night. These batteries can be large and heavy, taking up space and need to be replaced from time to time

Non-Conventional form of energy

WIND ENERGY

- Winds are caused by the uneven heating of the atmosphere by the sun, the irregularities of the earth's surface, and rotation of the earth.

- Large wind farms consist of hundreds of individual wind turbines which are connected to the electric power transmission network.

Footnotes

Non-Conventional form of energy

Advantages of Wind Energy	Dis-advantages of Wind Energy
➤ Wind Energy is an inexhaustible source of energy and is virtually a limitless .	➤ It is unreliable energy source as winds are uncertain and unpredictable.
➤ Energy is generated without polluting environment.	➤ Requires large open areas for setting up wind farms.
➤ This source of energy has tremendous potential to generate energy	➤ Noise pollution problem is usually associated with wind mills.
➤ Wind Energy can be used directly as mechanical energy.	➤ Transmission cost of electricity is more due to remote location of turbine.
➤ In combination with Solar Energy, they can be used to provide reliable as well as steady supply of electricity.	➤ It can be a threat to wildlife and birds. ➤ Maintenance cost of wind turbines is high as they have mechanical parts.

Footnotes

Non-Conventional form of energy

- **TIDAL ENERGY**
  - Tides are the waves caused due to the gravitational pull of the moon and also sun
  - The energy derived from the rise and fall of the sea tide is converted into electricity at Sea shore.

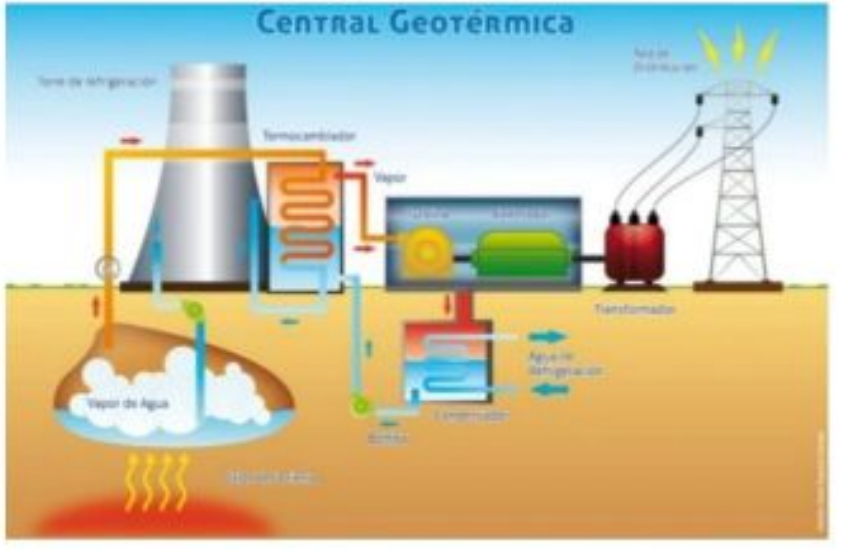
Non-Conventional form of energy

ADVANTAGES OF TIDAL ENERGY	DISADVANTAGES OF TIDAL ENERGY
➤ Tidal energy is environment friendly energy and doesn't produce greenhouse gases. ➤ We can predict the rise and fall of tides as they follow cyclic fashion. ➤ Efficiency of tidal power is far greater as compared to coal, solar or wind energy. ➤ Maintenance costs are relatively low. ➤ Tidal Energy doesn't require any kind of fuel to run. ➤ The life of tidal energy power plant is very long.	➤ Cost of construction of tidal power plant is high. ➤ sea waves are unpredictable and there can be damage to power generation units. ➤ Influences aquatic life adversely and can disrupt migration of fish. ➤ The tides only happen twice a day so electricity can be produced only for that time. ➤ Frozen sea, low or weak tides, straight shorelines, low tidal rise or fall are some of the obstructions. ➤ This technology is still not cost effective and needs more technological advancements.

Non-Conventional form of energy

GEOTHERMAL ENERGY

- Geothermal energy is the energy obtained from the earth (Geo) from the hot rocks present inside the earth.
- This is the heat of the interior of the earth present at volcanic regions, geysers or hot springs.



Footnotes

Non-Conventional form of energy

ADVANTAGES OF GEOTHERMAL ENERGY	DISADVANTAGES OF GEOTHERMAL ENERGY
➤ By far, it is non-polluting and environment friendly. ➤ There is no wastage or generation of by-products. ➤ Geothermal energy can be used directly. ➤ Maintenance cost of geothermal power plants is very less. ➤ Geothermal power plants don't occupy too much space and thus help in protecting natural environment. ➤ Unlike solar energy, it is not dependent on the weather conditions	➤ Only few sites have the potential of Geothermal Energy. ➤ Total generation potential of this source is too small. ➤ There is always a danger of eruption of volcano. ➤ Installation cost of steam power plant is very high. ➤ There is no guarantee that the amount of energy which is produced will justify the capital expenditure and operations costs. ➤ It may release some harmful, poisonous gases that can escape through the holes drilled during construction

Footnotes

Non-Conventional form of energy

- **BIOMASS**
  - Biomass means all materials which come from living organisms. For instance, waste material of plants and animals, wood, agricultural wastes, dead parts of plants and animals.

Footnotes

Non-Conventional forms of energy

ADVANTAGES OF BIOMASS ENERGY	DISADVANTAGES OF BIOMASS ENERGY
➤It is comparatively lesser pollution generating energy. ➤ Biomass energy helps in cleanliness in villages and cities and provides manure for the agriculture and gardens. ➤ Biomass energy is relatively cheaper and reliable. ➤ It can be generated from everyday human and animal wastes, vegetable and agriculture left-over etc. ➤ Recycling of waste reduces pollution and spread of diseases.	➤ Cost of construction of biogas plant is high, so only rich people can use it. ➤ Continuous supply of biomass is required to generate biomass energy. ➤ Biogas plant requires space and produces dirty smell. ➤ Due to improper construction many biogas plants are working inefficiently. ➤ It is difficult to store biogas in cylinders. ➤ Transportation of biogas through pipe over long distances is difficult.

Footnotes

Non-Conventional forms of energy

HYDRO POWER ENERGY

- Hydropower or hydroelectricity refers to the conversion of energy from flowing water into electricity.
- It is considered a renewable energy source because the water cycle is constantly renewed by the sun

Footnotes

Non-Conventional form of energy

ADVANTAGES OF HYDRO POWER ENERGY	DIS ADVANTAGES OF HYDRO POWER ENERGY
➤ Hydropower is fueled by water, so it's a clean fuel source. ➤ Hydropower doesn't pollute the air like power plants that burn fossil fuels ➤ Hydropower relies on the water cycle, which is driven by the sun, thus it's a renewable power source. ➤ Hydropower is generally available as needed, engineers can control the flow of water through the turbines to produce electricity on demand.	➤ Fish populations can be impacted if fish can not migrate ➤ Hydropower can impact water quality and flow. ➤ Hydropower plants can cause low dissolved oxygen levels in the water, a problem that is harmful to riverbank habitats ➤ Hydropower plants can be impacted by drought.

Footnotes

References:

1. Dr. J. P. Sharma, 2009. Environmental Studies, 2nd Edition, Laxmi publications, New Delhi, India.
2. M.P. Singh, 2005, Environment and Natural Resources Hardcover, Satish Serial Publishing House, Delhi India.
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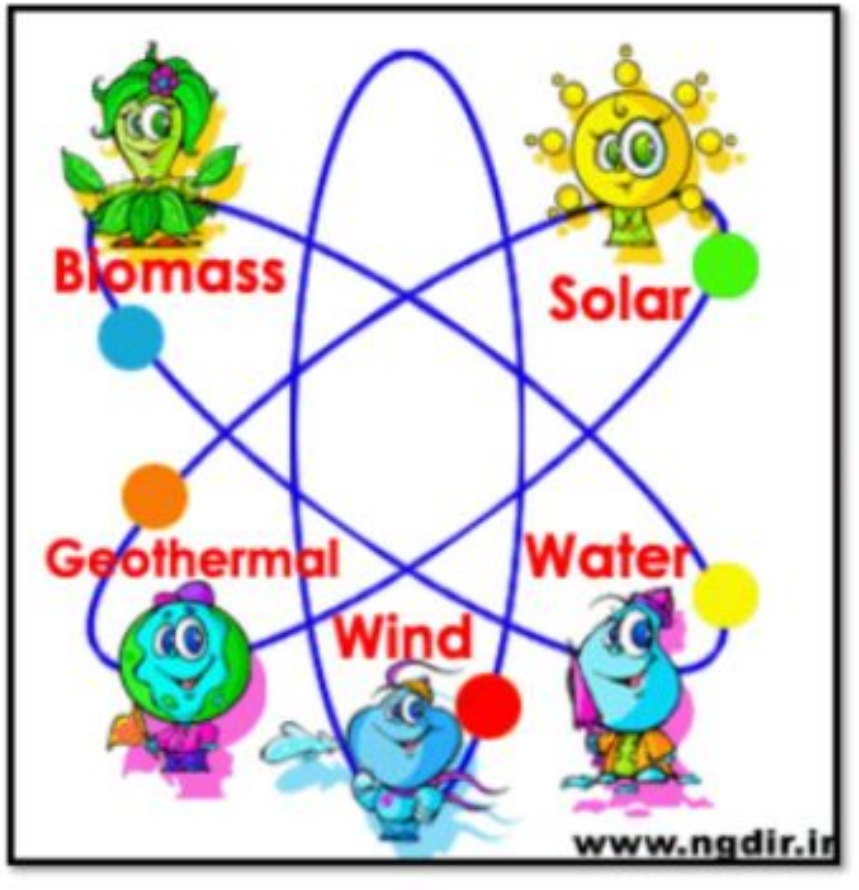
Forms of Energy



These different forms of energy are the driving force of todays technology world. So its proper use is a Global responsibility

Summary

We have studied :

- conventional form of energy with advantages and disadvantages

- non-conventional form of energy with advantages and disadvantages

Footnotes

Now let's have a Quiz.....

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Unit II: Energy Resources

CO 2: Select alternative energy resources for Engineering Practices

UO 2c: State the causes and effects of depletion of resources.
UO 2f: State the impacts of over use of natural resources.

08/07/2020

Topic: Importance of Natural Resources

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What we will learn today?

Learning Objective/ Key takeaways:

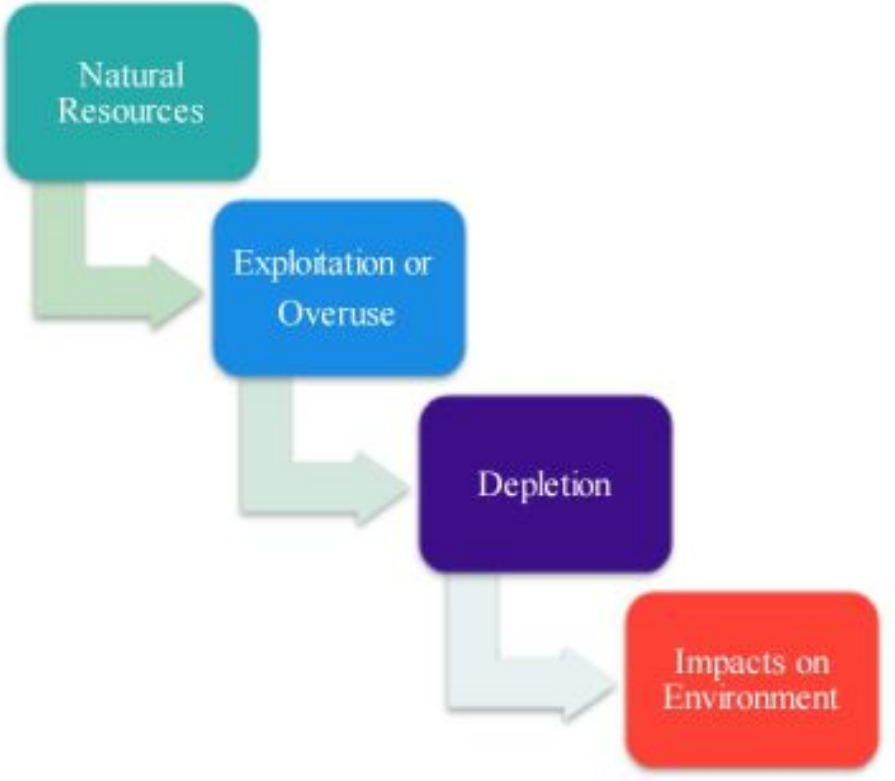
- Know the Causes and effects of depletion of resources
- Understand impacts of over use of natural resources on environment.

Contents:

2.3 Causes and effects of depletion of resources

2.7 Overuse of natural resources and its impacts on environment

Concept Map



Depletion of Natural Resource

- Resource Depletion occurs when the renewable and non-renewable natural resources become scarce because they are consumed faster than they can recover.

- All of these resources have been depleted primarily because of human activities.

Causes of depletion of Natural Resource

1. Overpopulation:

- "Population growth is driving all of our resource problems, including water, agricultural land and energy,"
- The Earth can only produce a limited amount of water and food, which is falling short of the current needs.

2. Overconsumption:

- This is the excessive and unnecessary use of resources.
- Natural resources in many regions are owned by private companies but they misuse it for getting more profit.

3. Wastage:

- Without paying much attention, we use a lot of electric energy each day from charging electronics to watching TV
- Similarly Water is also wasted in various domestic and industrial works.

Causes of depletion of Natural Resources

4. Deforestation:

- Natural calamities like hurricanes, forest fires, parasites and floods destroys the Forests
- Human activities as agricultural expansion, cattle breeding, timber extraction, mining, oil extraction, dam construction and infrastructure development.

5. Mining of Minerals and Oil.

- The increased exploitation of different minerals has led to some of them entering into a production decline.
- For example, minerals such as Gasoline, Copper, and Zinc production are estimated to decline in the next 20 years.

Causes of depletion of Natural Resources

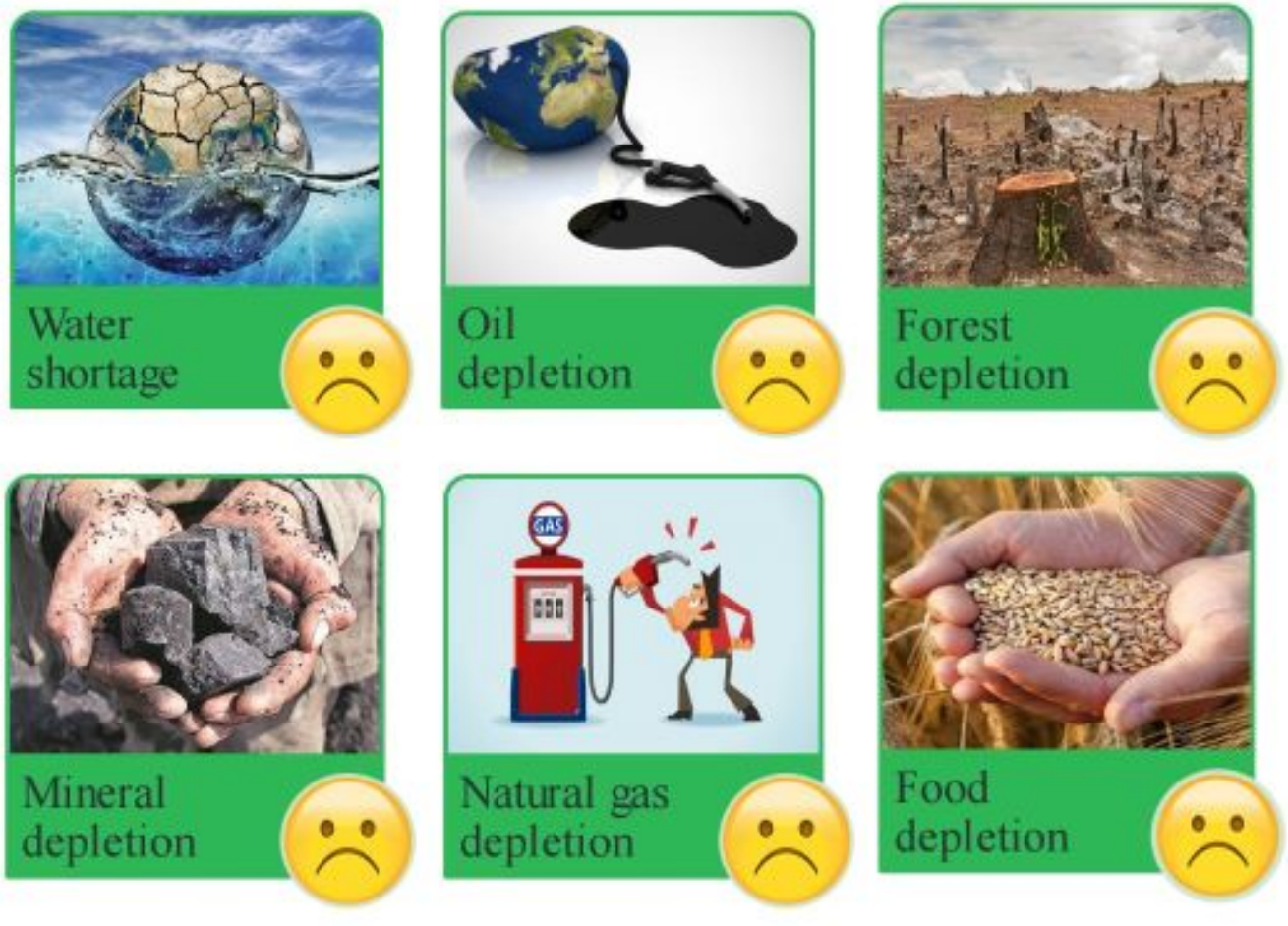
6. Technological and Industrial Development:

- Industrial and technological advancements have also driven the demand for virgin materials for research, development, and production.
- More resources are hence being used to satisfy the industrial demands, increasing the rate of natural resource depletion.

7. Pollution and Contamination of resources:

- The poor quality of wastewater effluents is responsible for the degradation of the receiving surface water body. It is harmful for the aquatic ecosystem.
- The wrong Agricultural practices contaminates the land resources and make it unsuitable for crop production

Effects of depletion of Natural Resource



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Overuse of Natural Resources

- We derive numerous useful substances from natural resources but when **'need'** turns to **'greed'** it starts **over exploitation**.

- **impacts of Overuse of Natural Resourceson environment**

1. Deforestation.
2. Desertification
3. Soil erosion
4. Land Slides
5. Extinction of species

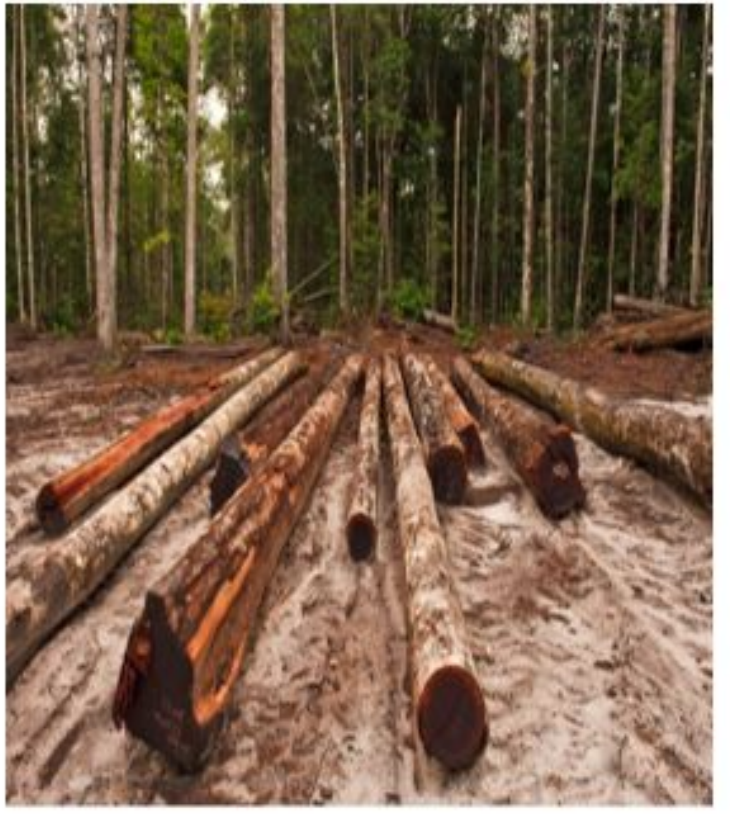
1. Deforestation

- Deforestation is the clearance of forests by logging and/or burning.
- Trees absorb greenhouse gases and carbon dioxide and produce the oxygen we breathe.
- Forests are the habitats of millions of species.
- **Causes of Deforestation**

1. Construction of Roads
2. Mining
3. Hydroelectric projects
4. Forest fires

- **Effects of Deforestation**

The loss of trees and other vegetation can cause climate change, desertification, soil erosion, fewer crops, flooding, increased greenhouse gases in the atmosphere.



2. Desertification

- Desertification is a process by which fertile land becomes desert.
- **Causes for the origin of manmade deserts**

1. Removal of trees .

2. Modern methods of agriculture instead of more traditional.

3. Over exploitation of fertile soil particularly in areas of low rainfall by cultivating cash crops.

- **Effects of Desertification**

- **It** reduces the ability of land to support life, affecting wild species, domestic animals, agricultural crops and people.
- The reduction in plant cover results in Drought leads to accelerated soil erosion by wind.

3. Soil erosion

- It is the washing or blowing away of the top layer of the soil.

- **Manmade Causes of soil erosion**

overgrazing by cattle, cutting down of trees, agricultural activities, construction of buildings and laying of roads.

- **Effects of soil erosion**

1. It washes away the nutrients in soil resulting in infertility of the soil.
2. It has led to increased pollution and sedimentation in streams and rivers, clogging these waterways
3. Degraded lands are also often less able to hold onto water, which can worsen flooding.

Flood

4. Land Slides

- It is the movement of rock, earth, or debris down a sloped section of land.

- **Natural Causes of Landslides**

Rain, Cyclones, Earthquakes, Volcanoes

- **Manmade Causes of Landslides**

Unsafe Mining Activities, construction of dams

- **Effects of Landslides**

The cost to repair structures, loss of property value, disruption of transportation routes, medical costs in the event of injury, loss of timber, Water availability.

5. Extinction of species

- Extinction occurs when species are diminished because of environmental forces

- **Causes of Extinction of species**

1. habitat fragmentation
2. natural disaster
3. decline in population numbers due to poor reproduction
4. overexploitation of species for human use

- **Effects of Extinction of species**

extinction can also **impact** populations of prey, which can cause dramatic ecosystem and food web changes.

Tasmanian Tiger

Formosan Clouded Leopard

passenger Pigeon

Pyrenean Ibex.

Solutions for Conserving Natural Resources

- Controlling deforestation
- Reducing oil, mineral consumption
- More exploration and use of Renewable source of energy like biogas, biofuels etc
- Protecting wetlands and coastal ecosystem
- Awareness creation
- Treatment of industrial wastes and sewages before release in the water bodies.
- Rain water harvesting.
- Ensure the recycling of wastes.
- Sustainable farming practices like crop rotation.
- Constructions of reservoirs

Refferences:

1. Prof. Erach Bharucha, 2004. Textbook for Environmental Studies. University Grants Commission, New Delhi, India.
2. Dr. Y. K. Singh, 2006. Environmental Science. NEW AGE INTERNATIONAL (P) LIMITED, PUBLISHERS, New Delhi, India.
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Natural Resources are Very Important

Say No to Exploitation

Say Yes To Conservation

The knowledge of importance of Natural resources is very essential to understand the its applications, Global need, and future demands

Once you understand the importance of natural resources, you will understand the need of its conservation

Summary

We have studied :

- Causes and effects of depletion of resources
- Overuse of natural resources and its impacts on environment

Now let's have a Quiz.....

Program – CIVIL ENGINEERING
Program Code – CE

Course- ENVIRONMENTAL STUDIES
Course Code – 22447

08/07/2020

MSBTEs e-content

MSBTE LEAD- STUDY AT YOUR DOORSTEP

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Nagpur

Unit II: Energy Resources

CO 2: Select alternative energy resources for Engineering Practices

UO 2b: Describe Renewable, Nonrenewable and Cyclic resources.

08/07/2020

Topic: Types of Natural Resources

Written by

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Lecturer, Government Polytechnic, Gadchiroli

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Lecturer, NIT Polytechnic, Nagpur

What we will learn today?

Concept Map

Learning Objective/ Key takeaways:

- Information about various Renewable, Nonrenewable & Cyclic Resources

Contents: 2.2

1 Renewable Resources

2 Nonrenewable Resources

3 Cyclic Resources

Renewable Resources

- Resources that can be replenished naturally in the course of time are called Renewable Resources.
- These energy sources are continuously replenished at a constant rate.

- Examples of Renewable Resources

1. Solar power
2. Hydro power
3. Wind energy
4. Tidal energy
5. Geothermal energy
6. Biogas

1. Solar power

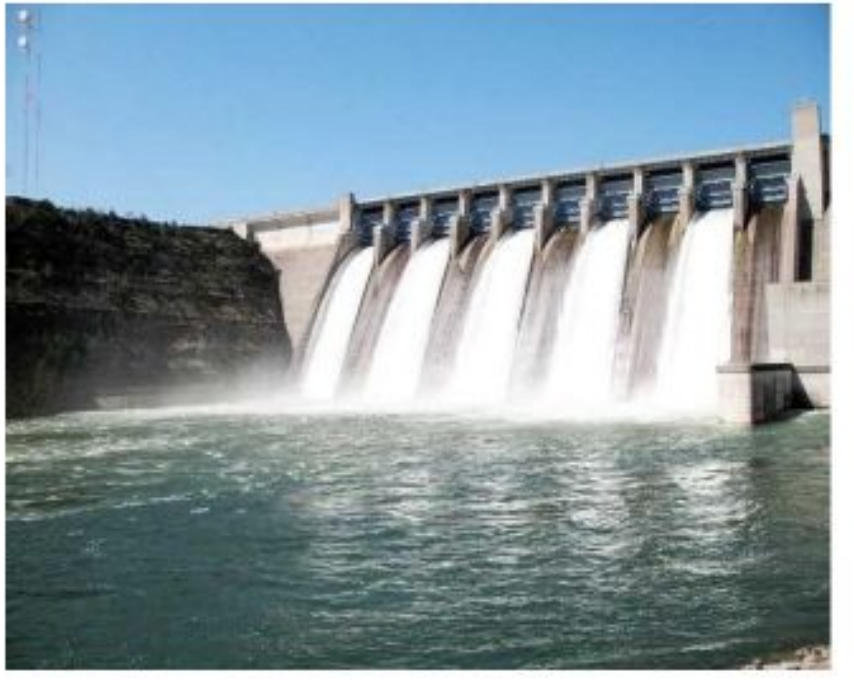
- The Sun is a powerful source of energy that provides the Earth with as much energy every hour as we collectively use in a year worldwide
- 2,000 millionth unit of solar energy does the earth intercept
- Solar energy is obtained from the sun by capturing the solar radiation and converting it into another form of energy for performing various activities
- Uses:

1. Solar Cooker
2. Solar water heater
3. Solar electricity generator

Solar Paneled Station

2. Hydro power

- Hydro power is the energy derived from the falling water or running water.
- Falling water is channeled through water turbines which rotates a shaft and drives an electrical generator, converting the motion into electrical energy.
- Dams are constructed across the river is used for generating Hydro electricity



- Uses :

1. **Hydropower plants** can generate **power** to the grid immediately, they provide essential back-up **power** during major **electricity** outages or disruptions.
2. **Hydropower** efforts produce a number of benefits, such as flood control, irrigation, and water supply.

3. Wind energy

- Winds are caused by the uneven heating of the atmosphere by the sun, the irregularities of the earth's surface, and rotation of the earth.

- Large wind farms consist of hundreds of individual wind turbines which are connected to the electric power transmission network.

- Uses:

1. The wind energy can be converted into mechanical and electrical energies to generate electricity using wind mills.

4. Tidal energy

- The energy derived from the rise and fall of the sea tide is converted into electricity at Sea shore.

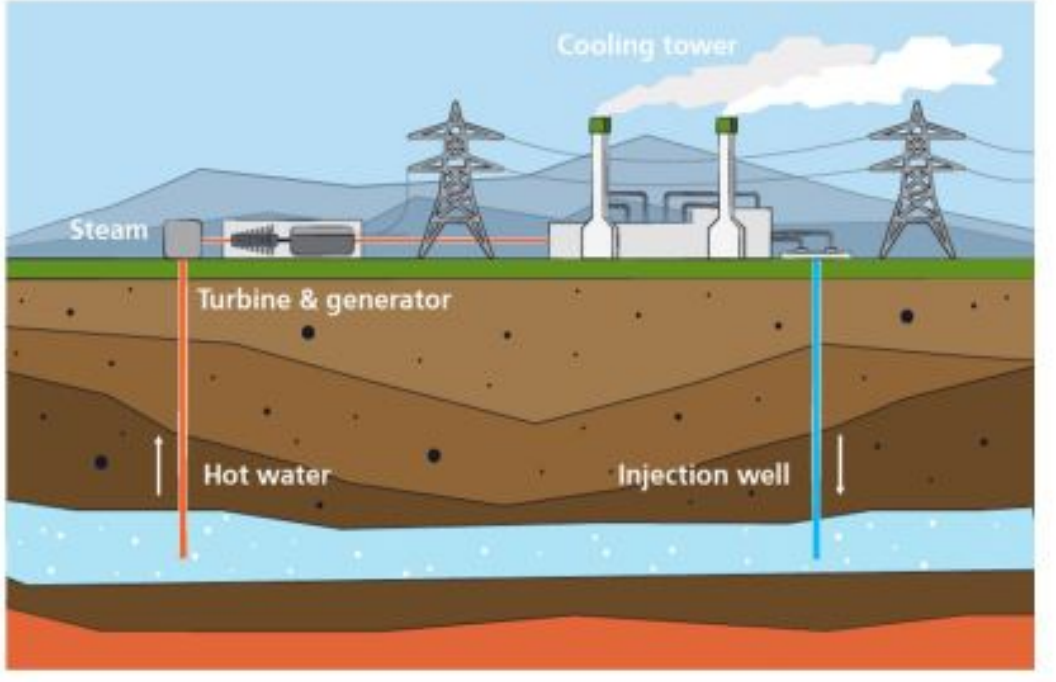
- Uses:

1. Tidal energy is used to rotate turbines and generate electricity.
2. Energy Storage – Tidal Energy can also be used as a store of Energy.

5. Geothermal energy

- Geothermal energy is thermal energy generated and stored in the Earth.
- This is the heat of the interior of the earth present at volcanic regions, geysers or hot springs.
- Uses:

1. It is utilized to generate electricity.
2. It is used for heating building, raising plants in greenhouses, drying crops, heating water at fish farms, and several industrial processes, such as pasteurizing milk.

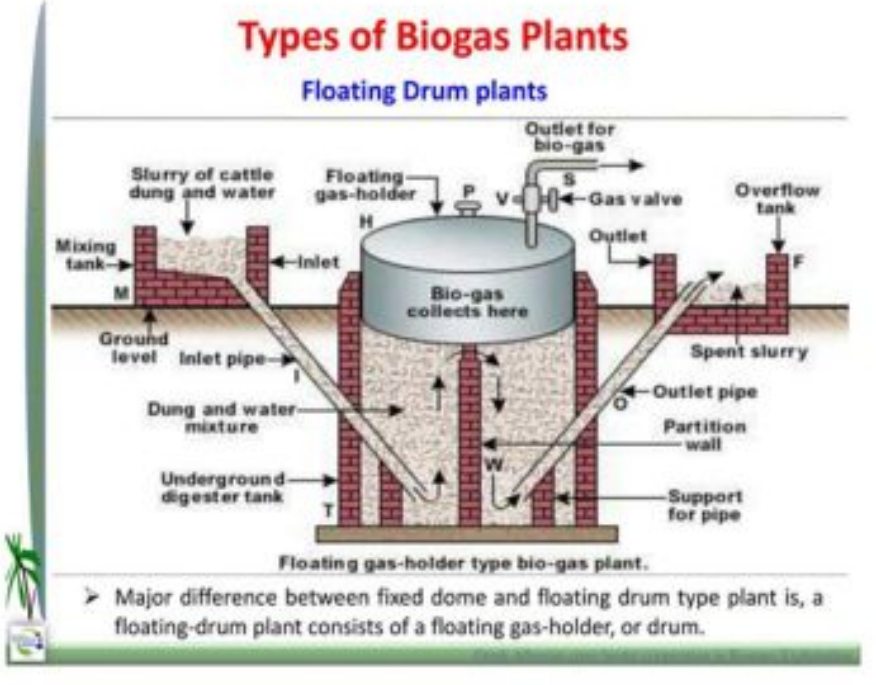


6. Biogas

- Gobar Gas is a smokeless domestic fuel. It can be produced from cattle dung and other farm organic matters.
- The methane gas is generated from Gobar Gas Plant which having high Calorific value.

- Uses:

1. It is used for cooking purpose as well as for lighting the out door street lamp.



Nonrenewable Resources

- Resources that exist in limited supply and can not be replaced if they are used up are called Non-renewable Resources.
- These energy sources are Exhaustible

- Examples of Non-renewable Resources

1. Oil
2. Natural gas
3. Coal
4. Nuclear fuels

1. Oil

- Liquid petroleum -crude oil- is the only nonrenewable resource in fluid form.

- Industrial nations, with the U.S. far in the lead, are the biggest consumers of crude oil.

- Uses:

1. For Getting Gasoline, heating oil, and diesel fuel.
2. Manufacturers utilize oil as the base for Some products like plastics and industrial chemicals.

2. Natural gas

- Natural gas is a fossil fuel formed when layers of buried plants, gases, and animals are exposed to intense heat and pressure over thousands of years.

- Once drillers extract natural gas, processing plants remove the propane and butane to obtain liquefied petroleum gas (LPG)

- Uses:

1. LPG is used as a household and industrial fuel
2. LPG is also used as a fuel in Vehicles.

3. Coal

- Coal is the product of millions of years of pressure on original plants organic matter buried underground.
- It is a combustible black or brownish-black sedimentary rock.
- Uses:

1. At the power plant, coal is commonly burned in a boiler to produce steam. The steam is run through a turbine to generate electricity.
2. It is also used for metallurgical, industrial and domestic purposes.

4. Nuclear fuels

- Nuclear power, or nuclear energy, is the use of exothermic nuclear processes, to generate useful heat and electricity.
- The term includes nuclear fission, nuclear decay and nuclear fusion.
- Uses: Nuclear fuel is used in nuclear power stations to produce heat to power turbines for electricity generation.

Cyclic Resources

- The resources which can be used again and again after passing through some processes are known as cyclic resources.
- For example, water used in industry and domestic ways can be cleaned and used again for similar or other purpose. Such resources are given the name of Cyclic Resources.

Refferences:

1. Prof. Erach Bharucha, 2004. Textbook for Environmental Studies. University Grants Commission, New Delhi, India.
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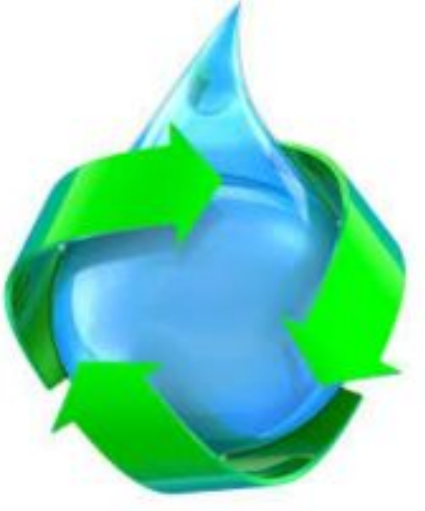
Types of Natural Resources

Renewable Resources

NonrenewableResources

Cyclic Resources



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Summary

We have studied :

- Renewable Resources
- NonrenewableResources
- Cyclic Resources

Now let's have a Quiz.....