



## Energy Resources

In our quest to power our world and meet the growing demands for energy, it is crucial for us to gain a comprehensive understanding of "Energy Resources." This note is intended to introduce you to this important topic and set the stage for deeper exploration during your studies.

Energy resources refer to the various natural or man-made sources of energy that can be converted into useful forms of power or energy for human activities. These resources are crucial for powering homes, industries, transportation, and various other applications.

Energy resources are the raw materials, substances, and technologies that provide the power to drive our societies, industries, and economies.

These resources are divided into two main categories: renewable and non-renewable.

### 1. Non-Renewable Energy Resources:

Non-renewable energy resources, such as fossil fuels (coal, oil, natural gas) and nuclear power, are finite and can be depleted. These sources have been the primary drivers of industrialization and economic growth for many decades. However, they are associated with environmental challenges, including pollution and climate change.

### 2. Renewable Energy Resources:

Renewable energy resources are inexhaustible and environmentally friendly. These include solar power, wind energy, hydropower, geothermal energy, and biofuels. Renewable resources have gained increasing attention as the world seeks to transition to more sustainable energy solutions.

#### Non-renewable Energy Resources:

**1. Fossil Fuels:** These include coal, oil, and natural gas. They are the primary sources of energy for most of the world. However, they are finite resources and contribute to environmental issues like air pollution and climate change due to carbon emissions.



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**2. Nuclear Energy:** Nuclear power is generated by the fission of uranium or plutonium nuclei. It provides a significant amount of electricity, but concerns about nuclear accidents, waste disposal, and proliferation limit its growth.

### Renewable Energy Resources:

**1. Solar Energy:** Solar panels capture energy from the sun and convert it into electricity. Solar power is clean, sustainable, and has been rapidly growing in popularity due to falling costs.

**2. Wind Energy:** Wind turbines convert the kinetic energy of the wind into electricity. Wind power is abundant in many regions and has minimal environmental impacts compared to fossil fuels.

**3. Hydropower:** This energy source harnesses the power of flowing water to generate electricity. Large-scale dams have been controversial due to their environmental impact, but smaller, more sustainable installations are gaining popularity.

**4. Biomass:** Biomass energy is derived from organic materials like wood, crop waste, and even algae. It's considered renewable if managed sustainably, but overharvesting can deplete resources.

**5. Geothermal Energy:** Geothermal power utilizes heat from the Earth's interior to generate electricity. It is a consistent and reliable source of energy with minimal environmental impact.



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# Sailajananda Falguni Smriti Mahavidyalaya

## Study Materials (Environmental Science)

Arunava Dutta Sarma



### Key Considerations:

- 1. Environmental Impact:** Non-renewable resources, particularly fossil fuels, are associated with pollution and contribute to climate change. The environmental impact of energy production is a significant concern, leading to a shift toward renewable sources.
- 2. Energy Security:** Many nations depend on non-renewable resources, which can be vulnerable to price fluctuations and geopolitical tensions. Diversifying energy sources is critical for energy security.
- 3. Economic Factors:** The cost of renewable energy technologies has been decreasing, making them increasingly competitive with traditional sources. Government incentives and policies can further accelerate the transition to renewables.
- 4. Technological Advancements:** Ongoing research and development in energy storage, grid integration, and energy efficiency are key to maximizing the potential of renewable resources.
- 5. Energy Transition:** As society seeks to reduce carbon emissions and combat climate change, there is a global shift toward cleaner and more sustainable energy sources. Policymakers, businesses, and individuals play vital roles in this transition.



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### Why Study Energy Resources?

Understanding energy resources is essential for several reasons:

- 1. Sustainability:** It's vital to find sustainable energy solutions to ensure a livable planet for future generations.
- 2. Economic Impact:** Energy resources have a profound impact on the global economy. Recognizing this impact is crucial for business and policy decisions.
- 3. Technology and Innovation:** Energy is a field ripe for innovation and investment. Studying energy resources equips you to be part of shaping the future.
- 4. Environmental Stewardship:** As responsible global citizens, we must grasp the environmental implications of our energy choices and work towards minimizing harm.
- 5. Policy and Governance:** Understanding energy resources is fundamental for policymakers and regulators shaping energy policies.



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**Multiple-choice questions (MCQs) with answers:**

**( Set- 1 )**

1. Which of the following is a non-renewable energy resource?

- a) Solar power
- b) Wind power
- c) Natural gas
- d) Geothermal energy

Answer: c) Natural gas

2. Which renewable energy source is derived from the Earth's internal heat?

- a) Solar power
- b) Wind power
- c) Hydroelectric power
- d) Geothermal energy

Answer: d) Geothermal energy

3. What is the primary greenhouse gas emitted from burning fossil fuels for energy?

- a) Oxygen
- b) Carbon dioxide (CO<sub>2</sub>)
- c) Nitrogen
- d) Methane (CH<sub>4</sub>)

Answer: b) Carbon dioxide (CO<sub>2</sub>)

4. What type of renewable energy is harnessed from the kinetic energy of moving air?\*\*\*

- a) Solar power
- b) Biomass energy
- c) Wind power
- d) Hydroelectric power

Answer: c) Wind power



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5. Which fossil fuel is primarily used for electricity generation in most power plants?

- a) Coal
- b) Natural gas
- c) Petroleum
- d) Uranium

Answer: a) Coal

6. What is the process of splitting atoms to release energy in a controlled manner called?

- a) Nuclear fusion
- b) Nuclear fission
- c) Chemical reaction
- d) Combustion

Answer: b) Nuclear fission

7. Which renewable energy source involves converting sunlight into electricity using photovoltaic cells?

- a) Hydroelectric power
- b) Geothermal energy
- c) Biomass energy
- d) Solar power

Answer: d) Solar power

8. What is the main component of natural gas?

- a) Oxygen
- b) Carbon dioxide
- c) Methane
- d) Hydrogen

Answer: c) Methane



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9. Which of the following is an example of a biofuel?

- a) Natural gas
- b) Gasoline
- c) Biodiesel
- d) Coal

Answer: c) Biodiesel

10. What is the term for the energy stored in an object due to its position or height above the Earth's surface?

- a) Kinetic energy
- b) Thermal energy
- c) Potential energy
- d) Chemical energy

Answer: c) Potential energy

( Set- 2 )

1. Which of the following is considered a renewable energy source?

- a. Coal
- b. Natural Gas
- c. Wind
- d. Uranium

Answer: c. Wind

2. What is the primary source of energy in fossil fuels?

- a. Solar energy
- b. Geothermal energy
- c. Chemical energy
- d. Nuclear energy

Answer: c. Chemical energy



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3. Which fossil fuel is the most abundant in the world?

- a. Oil
- b. Coal
- c. Natural gas
- d. Peat

Answer: b. Coal

4. Which of the following is a non-renewable energy source?

- a. Solar power
- b. Tidal energy
- c. Biomass
- d. Oil

Answer: d. Oil

5. What is the main advantage of nuclear energy as a power source?

- a. Low greenhouse gas emissions
- b. Unlimited supply of fuel
- c. Low initial construction cost
- d. High energy efficiency

Answer: a. Low greenhouse gas emissions

6. Which renewable energy source depends on the gravitational pull of the moon and the sun?

- a. Solar energy
- b. Geothermal energy
- c. Tidal energy
- d. Wind energy

Answer: c. Tidal energy



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7. What is the process of capturing and storing carbon dioxide emissions from power plants and industrial sources called?

- a. Carbon footprint reduction
- b. Carbon trading
- c. Carbon sequestration
- d. Carbon mining

Answer: c. Carbon sequestration

8. Which of the following energy sources is considered the most environmentally friendly and sustainable?

- a. Nuclear energy
- b. Coal
- c. Hydroelectric power
- d. Natural gas

Answer: c. Hydroelectric power

9. Which energy resource is produced from the remains of ancient marine microorganisms?

- a. Oil
- b. Natural gas
- c. Coal
- d. Wind

Answer: a. Oil

10. What is the term for the process of converting organic materials into biofuels or electricity?

- a. Combustion
- b. Fermentation
- c. Desalination
- d. Electrolysis

Answer: b. Fermentation.

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