

P7

ENERGY RESOURCES

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LEARNING OBJECTIVES

understanding the different
energy resources we use

the advantages and
disadvantages of different
energy resources

how we rely on the sun for
most of our energy resources

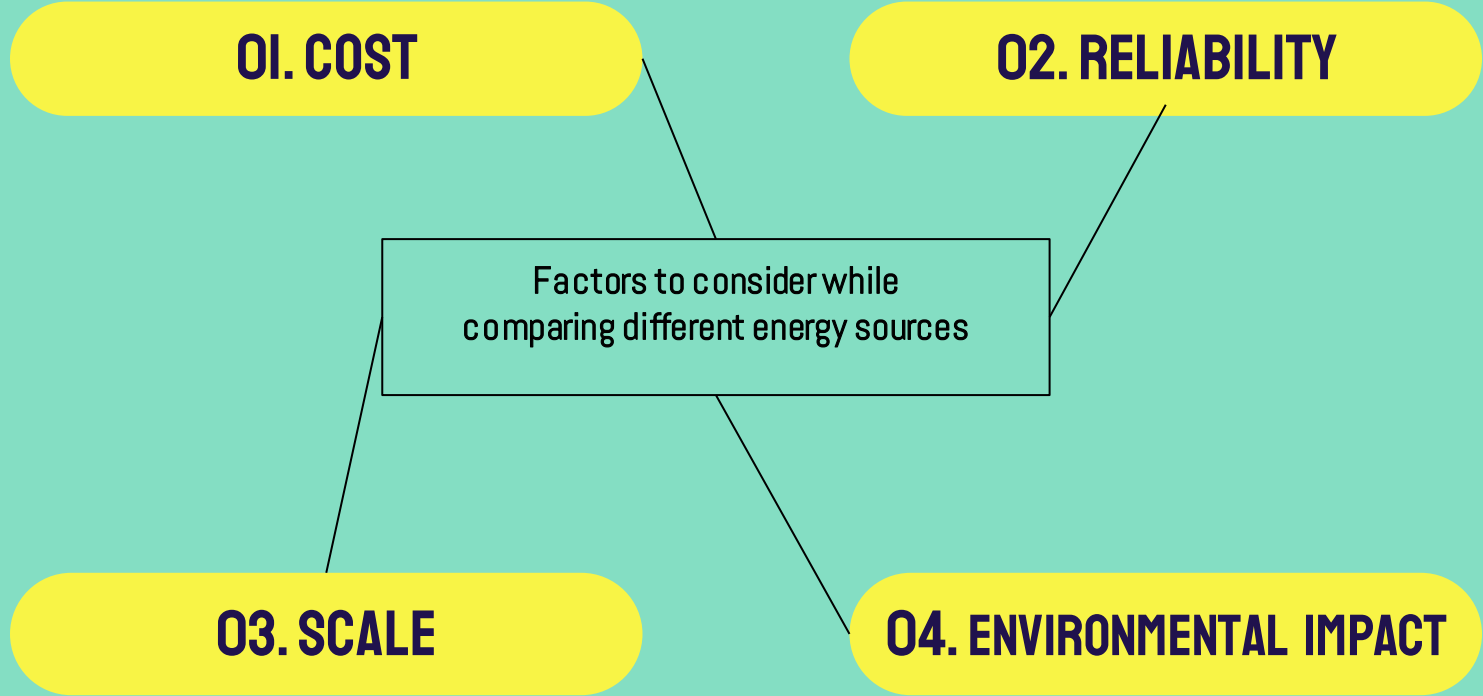
01. COST

02. RELIABILITY

Factors to consider while
comparing different energy sources

03. SCALE

04. ENVIRONMENTAL IMPACT



ENERGY DIRECT FROM THE SUN

Solar panels are used to collect thermal and light energy from the sun.

The energy of the rays is absorbed and the water inside heats up. This water can be used for different purposes.

When the sun's rays shine on a large array of solar cells, the energy of the rays is absorbed, and electricity is produced.



WIND AND WAVE POWER

Most of the energy of winds is given up to the sea as waves are formed by friction between wind and water.

There are many technologies for extracting energy from the wind. Windmills for grinding and pumping are traditional, and modern wind turbines can generate electricity.

Wave technology is tricky. The up-and-down motion of waves must be used to spin a turbine, which then turns a generator.



BIOMASS FUELS & FOSSIL FUELS

Biomass fuels are organic materials produced in a renewable manner. Two categories of biomass fuels, woody fuels and animal wastes, comprise the vast majority of available biomass fuels.



Fossil fuels are hydrocarbons, primarily coal, fuel oil or natural gas, formed from the remains of dead plants and animals.

hydrocarbon + oxygen \rightarrow carbon dioxide + water + energy



NUCLEAR FUELS

The fuel for a nuclear power station is usually uranium, sometimes plutonium. Inside a nuclear reactor, their radioactive decay is speeded up so that the energy they store is released much more quickly. This is the process of nuclear fission.

Nuclear power has proved to be expensive because of the initial cost of building the power stations, and the cost of disposing of the radioactive spent fuel and decommissioning the stations at the end of their working lives.



WATER POWER

Water stored behind a dam is released to turn turbines, which make generators spin. This is a very safe, clean and reliable way of producing electricity.

However, a new reservoir might flood land which could've been used for hunting or farming.



GEOHERMAL ENERGY

The interior of the earth is hot. People make use of this heat, called geothermal energy, where hot rocks are found at a shallow depth below the earth's surface.

To make use of this energy, water is pumped down into the rocks where it boils. High-pressure steam returns to the surface, where it can be used to generate electricity.



RENEWABLES & NON-RENEWABLES

RENEWABLES

comes from sources that will run out or will not be replenished in our lifetimes

it has low carbon emission and hence environment friendly

it has high maintenance cost and large land area is required for the installation of its power plant

NON RENEWABLES

it might get exhausted one day

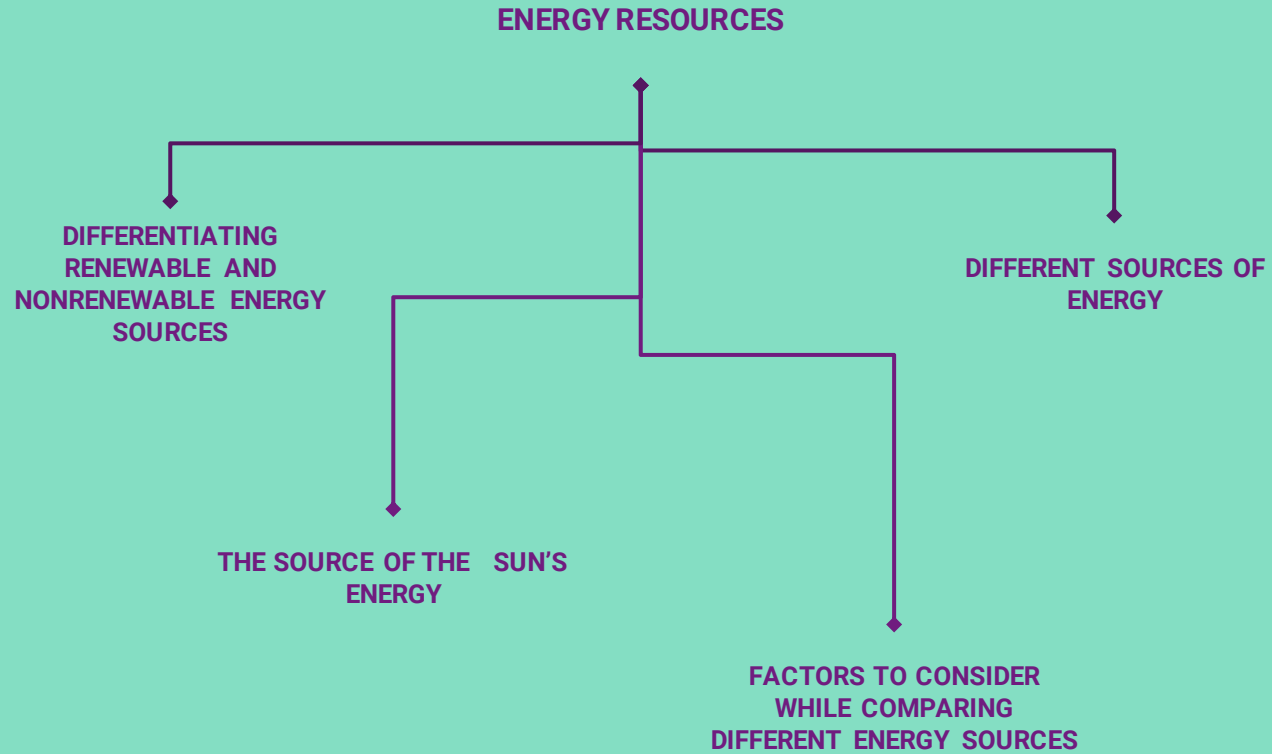
it has high carbon emission and hence not environment friendly

it has low maintenance and less land area is required for its power plant installation

THE SOURCE OF THE SUN'S ENERGY



The sun generates energy from a process called nuclear fusion. During nuclear fusion, the high pressure and temperature in the sun's core cause nuclei to separate from their electrons. Hydrogen nuclei fuse to form one helium atom. During the fusion process, radiant energy is released.



EXERCISE QUESTIONS

Explain whether the following energy sources are renewable or nonrenewable:

a) uranium - fuelled power station

b) wave power

Explain why wind and wave power could not be relied on to provide a country's entire electricity supply.

Name three fossil fuels and three non-fossil fuels

ENERGY RESOURCES (INTRO)

