

Renewable Energy

A course for senior class, AC branch, Mech. Eng. Dept., College of Eng., Mustansiriyah Univ.
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Chapter One Introduction

7.1 Definitions

Renewable Energy

Is energy obtained from **naturally repetitive** and **persistent** flows of energy occurring in the local environment. With a renewable Energy resource, the energy is already passing through the environment as a **current** or **flow**, irrespective of there being a device to intercept and harness this power. Other terms for Renewable Energy are: Green Energy, Sustainable Energy, New Energy.

Non-renewable Energy

Is energy obtained from **static** stores of energy that remain **underground** unless released by human interaction. Examples are nuclear fuels and the fossil fuels of coal, oil, and natural gas. Non-renewable energy is sometimes termed as: Brown Energy, Finite Supply, Traditional Energy.

Sustainability (Sustainable Development)

It is the approach of living, producing and consuming in a manner that meets the needs of the present without compromising the ability of future generations to meet their own needs. All renewable energies satisfy sustainable requirements.

7.2 Main types of renewable energy resources

- 1) Solar Energy
- 2) Wind Energy
- 3) Biomass (plant crops)
- 4) Hydropower (from rivers and waterfalls)
- 5) Ocean Waves
- 6) Tides
- 7) Geothermal Energy

7.3 Comparison between renewable and traditional energies

A schematic difference between renewable and traditional energy resources can be illustrated in Fig. 1.1, and Table 1.1 shows a detailed comparison between them.

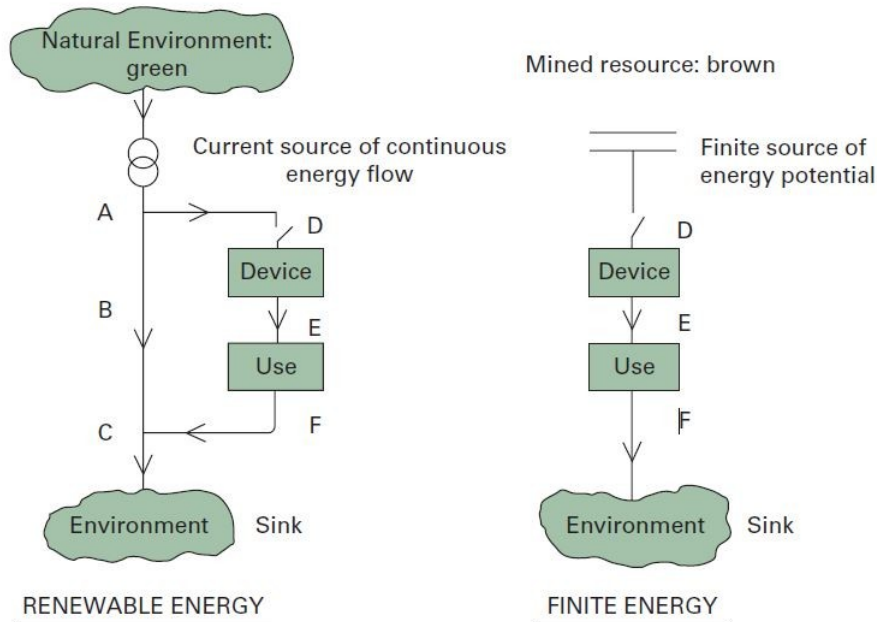


Fig. 1.1: General differences between traditional and renewable energies

Table 1.1: Comparison between renewable and traditional energy sources.

	Renewable (green)	Traditional (brown)
Examples	Solar, wind, biomass, hydro	Coal, oil, gas, nuclear
Source	Natural local environment	Underground stock
Intensity	Low ($< 300 \text{ W/m}^2$)	High ($> 100 \text{ kW/m}^2$)
Lifetime of supply	Infinite	Finite
Cost of source	Free	Increasingly expensive
Variation and control	Fluctuating and the load is controlled	Steady and the source can be controlled
Location of use	Site dependant	General and global use
Pollution	Not exists	Harmful polluting byproducts
Environment	<ul style="list-style-type: none"> - Hazards of wood burning - Soil erosion from excessive biofuel use - Hydro reservoir disruption 	<ul style="list-style-type: none"> - Climatic change due to greenhouse gas emissions - Permanent damage of water resources due to pollution and mining.