Energy Introduction


Image: Gretz. Warren

Energy is a critical factor in our daily lives. The energy in the food we eat serves as fuel for our life processes. Food itself is a result of the Sun's energy, thanks to plants and the process of **photosynthesis**. Humans began to manipulate energy sources thousands of years ago, learning to control food supplies through agricultural practices and harnessing energy in the form of fire to generate warmth and light. In the modern industrial age our relationship with energy has become more sophisticated than ever. We are now dependent on having easy access to complex forms of energy on a daily basis. Energy is used to drive to work, heat and cool our homes, provide light indoors and at night, and power most of our technology-based tools.

Most of us take for granted the light bulb that comes on when we flip a switch. We assume our homes will be warm when it is bitterly cold outside. We fuel our cars for the transportation our highly mobile society requires. Our ability to control energy has changed the very nature of our relationship to the Earth. We routinely cover vast distances, live in very cold or hot climates, and process vast quantities of raw materials used to produce the myriad of products we use in our lives. We live by manipulating energy. It is only during the occasional power outage or gas shortage that we realize how important energy is to us. Our continued success as a society depends on our ability to develop energy sources that are plentiful, renewable and environmentally sound.

As recently as 200-300 years ago, humans met a substantial amount of their energy needs using **renewable energy sources** such as wood for heat, watermills for grinding crops or wind to propel sailing vessels. Today, **nonrenewable fuels** such as **oil**, **natural gas** and **coal** provide the majority of the energy we use to fuel our modern technologically-based societies. The use of **fossil fuels** certainly has played a significant role in propelling our society forward from a horse-and-cart transportation system.


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While fossil fuels can be expected to remain an important component of our energy use, recent developments in energy generating systems show significant promise. "Alternative" energy sources such as **wind power**, **solar power**, **biomass** and **geothermal power** systems now offer approaches to providing energy that are renewable, while reducing our impact on the environment. We have only begun to tap our resources concerning these renewable energy sources. The future of energy is exciting. As we transition from a fossil fuel-based society to a future based on other energy sources, the "alternative" may no longer be alternative - it will likely become the norm.

ENERGY: THE CAPACITY TO DO WORK!

Glossary of Terms

Biomass: Any plant or animal matter; can be used as fuel especially as crop waste, wood, grasses, paper waste, and other plant material

Coal: A solid fossil fuel mined from the Earth's surface and underground which is often used to produce electricity through combustion. There are several different qualities of coal including anthracite, bituminous, and lignite

Energy: The ability to do work

Fossil fuels: Highly combustible substances generally found underground that were formed as the result of high levels of heat and pressure on decaying organic matter from millions of years ago. Fossil fuels include liquid oil, solid coal, and gaseous natural gas and are often burned to generate energy and power

Geothermal power: The utilization of the constant temperature of the Earth's crust to heat water and air as well as warmer temperatures deeper underground which can be used to heat water to steam to operate turbines and general electrical power. Can be used in the form of hydrothermal, direct use, or heat pump systems

Natural Gas: A fossil fuel gas which can be recovered from underground and combusted as a fuel source. Increasingly used to generate electricity

Nonrenewable energy source/fuel: Primary energy source that cannot be replenished at an equal or greater rate to its consumption; unsustainable energy source

Oil: Also known as petroleum; a viscous and combustible fossil fuel liquid found underground which can be refined into different products including fuels which are often burned for transportation or other energy needs

Photosynthesis: The biological process by which certain organisms (primarily plants) convert radiant energy (primarily from the Sun) into stored chemical energy

Renewable energy source: Primary energy source that can be replenished at an equal or greater rate to its consumption; sustainable energy source

Solar Power: Energy generation methods which harness the radiant and thermal energy of the Sun. The two primary types of solar energy systems are solar photovoltaics and solar thermals

Wind power: Technology which utilize the kinetic energy of moving wind to power turbines to generate electrical power

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