

ENERGY CHANGES

Energy is the most precious commodity we have. Without it there could be no life, no warmth, no movement. Energy gives us the power to do work, and in every country people's living standards are closely related to the availability of energy.

From the earliest times, people worshipped the sun. This is not surprising, for through the process of photosynthesis, the sun provides us with most of our food and, over millions of years, it has created our supplies of the fossil fuels.

The transfer of energy to or from chemicals plays a crucial part in chemical processes in industry and in living things. Consequently, the study of these energy changes is very important to us.

Our present-day living conditions rely heavily on the availability of energy in its various forms. Chemical energy is converted to heat energy when fuels such as gas, oil and coal are burnt in our homes and in industry. Within our own bodies, energy changes are vital. Foods such as fats and carbohydrates are important biological fuels. During metabolism, the chemical energy in these foods can be converted to heat energy to keep us warm, to mechanical energy in our muscles and to electrical energy in the signals within our nerve fibres.

Chemical energy is also converted to electrical energy when the materials in cells and batteries are used to generate electricity. All these important processes involve energy changes.

Until the Industrial Revolution, civilizations depended for their supply of energy on the labour of people and animals or on the harnessing of wind and water. Then, in the early nineteenth century, people began to

use coal as a source of heat and power in their homes.

Early in the XX century, oil began to make an impact. Discoveries multiplied fast and oil became plentiful, cheap and a source of many other products. Without oil, the internal combustion engine would have been impossible and the revolution in land, sea and air transport could never have taken place. Oil became the most convenient fuel for many industrial and domestic purposes and the basic raw material for the organic chemicals industry. In the 1970s, the first danger signals appeared as the rate of oil consumption increased faster than the discovery of new reserves. Unfortunately, there is only a finite amount of oil on the Earth. The situation with coal is much less alarming since its rate of consumption is lower and reserves are possibly twenty times greater than those of oil.

It is vital that we start to conserve our resources now, turning our thoughtless overconsumption to a more intelligent use of fuel and avoiding such frivolous wastes of energy as excessive heating and lighting in homes, offices, schools and factories. It has been shown that more than 20% of the energy used in heating buildings could be saved by better insulation of roofs and walls, double glazing at windows and the acceptance of slightly lower, but still comfortable temperatures.

One of the most wasteful users of fuel is the private car. Vast quantities of precious oil are also being squandered on industrial and domestic heating and on the generation of electric power. Oil is much too valuable for this purpose. It should be conserved as feedstock for essential chemicals.

(from: Hill-Hollman, *Chemistry in Context*, Nelson)

1

Explain and comment these statements taken from Energy changes.

- a. Energy is the most precious commodity we have.
- b. From the earliest times, people worshipped the sun.
- c. The study of energy changes is very important to us.
- d. Within our bodies, energy changes are vital.
- e. Early in the XX century, oil began to make an impact.
- f. In the 1970s, the first danger signals appeared.
- g. There is only a finite amount of oil on the Earth.
- h. The situation with coal is much less alarming... (*than with oil*).
- i. It is vital that we start to conserve our resources now.
- j. One of the most wasteful users of fuel is the private car.
- k. Oil is much too valuable for the purpose... (*of heating and generating electric power*).

2

Among the words underlined in Energy changes, choose those which complete the definitions below.

- a. are animals, plants and microbes.
- b. are basic substances used in the production of goods.
- c. is the conversion of carbon dioxide, water and inorganic salts into carbohydrates.
- d. is a natural resource or a product of great value.
- e. are a people's level of wealth, comfort, material goods and essentials.
- f. are risk indicators.
- g. is the social, economic and technological change that took place during the late 1700s and 1800s.
- h. are the first eras of human life on Earth.
- i. are threadlike conductors of nerve impulses.
- j. are two layers of glass set in a window to reduce heat flow in either direction.