

WAKE UP, MAN! IT'S TIME TO USE THE RENEWABLE ENERGY SOURCES!

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The world is moving into a new era, one of transition from almost total dependence of the fossil fuels to greater use of alternative renewable sources of energy.

The total energy we may be able to extract from renewable energy sources is enormous. But it is true that renewable energy sources are not equally available in all locations and they may not necessarily always be available when we need it.

Increasing of the human population and environmental problems, needs finding new way of energy producing. Using of the renewable energy sources offers our best chance to solve problems with deficit energy supplying.

We can evaluate the renewable sources and select the right mix of them for coming decades, by comparing them on the basis of those characteristics which are the most important to us: cost, advantages and disadvantages, environmental impact and potential for energy supplying.

Keywords: Sun, Hydrogen, Wind, Biomass, Water

Introduction to renewable energy sources

As we all know, the primary energy sources are fossil fuels, which supply approximately 90% of energy consumed by people. All other sources are considered as alternative and they can be divided into two groups: renewable (solar energy, wind and water power, biomass and hydrogen) and nonrenewable (nuclear and geothermal energy).

Renewable energy sources: sun, water, wind and biomass are often discussed as group, because they are all derived from the sun's energy. These energy sources are renewable, because they are regenerated from the Sun within a time period useful to humans.

Solar energy

The total amount of solar energy reaching the Earth's surface is tremendous. Solar energy may be used directly through passive solar systems or

active solar systems. Passive solar systems often involve architectural designs, which absorb solar energy without requiring the mechanical power. Active solar systems require mechanical power, usually electric pumps and other equipment to circulate water, air or other fluids from solar collectors to a location where the heat is stored until is used.

Photovoltaics is a technology that converts sunlight directly into a electricity. The system uses solar cells, also called photovoltaic cells, made of thin layers of semiconductors (silicon or other material) and solid-state electronic components with few or no moving parts. Electricity is made when the sunlight strikes the cell. The different electronic properties of the layers cause electrons to flow out of the cell through electric wires. Photovoltaic cells can also work with a light different from the Sun. For example, using the light from our desk lamp, a photovoltaic cell can produce electricity to light a small bulb in a clock. Today photovoltaic cells are used in satellites and space vehicles. Another commercial use is as a power in remote areas for electric equipment such as water-level sensors, meteorological stations and emergency telephones. This technology is perfect for use in developing countries, because they are demonstrating that solar technology can be simple and relative inexpensive.

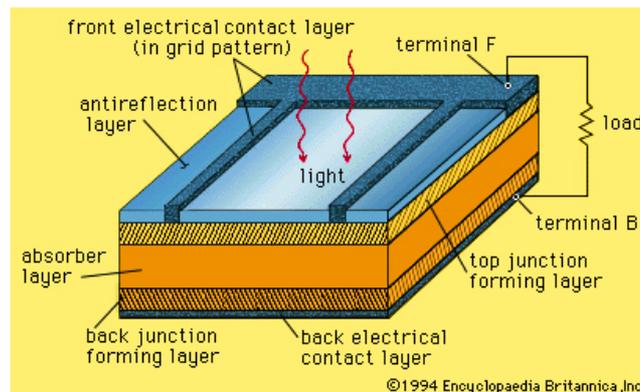


Fig. 1. Solar collector

The use of the solar energy generally has a relatively low impact on the environment, but there are some environmental concerns. One disadvantage of the solar energy is that it is relatively dispersed and the second is that solar equipment and manufacture of the solar collectors includes metals, glass, plastics and some other materials which can be toxic.

Hydrogen

Hydrogen is high-quality fuel that can be used in any of the ways in which we normally use fossil fuels, such as to power automobile and to heat water and

buildings. When hydrogen is used and stored in fuel cell, which are similar to batteries, it can be used to produce electricity. Hydrogen, like natural gas, can be transported in pipelines and stored in tanks; and it can be produced using solar and other renewable energy sources. It is a clean fuel, the final product of the burning is water so it does not contribute to the global warming, air pollution or acid rains.

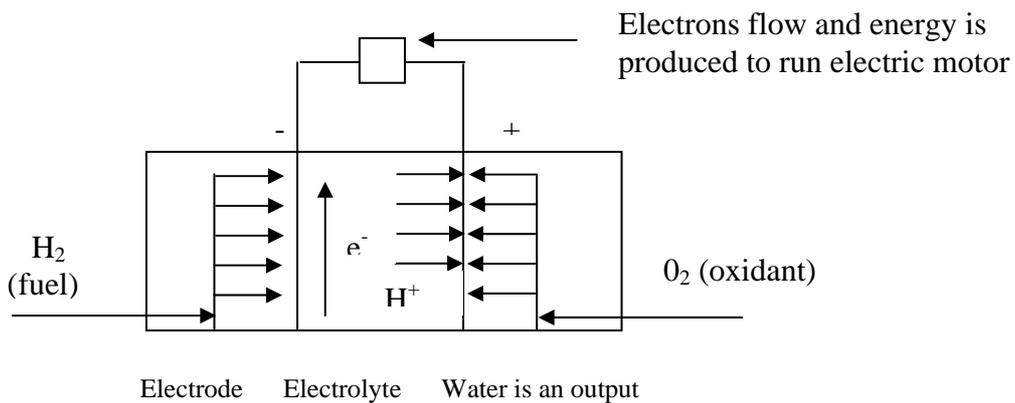


Fig. 2. Idealized diagram showing how a hydrogen fuel cell works

Wind power

Wind power, like solar power, has evolved over a long period of time from early Chinese and Persian civilization to the present. During recent years, wind energy use has grown at approximately 25%, over 10 times the growth of the rate of oil use. The use of wind power will not solve all our energy problems, but as one of the major alternative energy sources, wind power can be used at particular sites to reduce dependence on fossil fuels and help achieve sustainability. But wind energy has few disadvantages like: windmills kill birds; large windmills use large areas of land for roads and windmills may degrade an area's scenic resources.

Fig. 3. Windmills in Holland



Biomass energy

Biomass energy is energy recovered from biomass-organic matter, such as plant material and

animal waste. Biomass fuel is organic matter that can be burned directly or converted to another form and then burned. For example, we can burn wood in a stove or convert it into charcoal to use as a fuel. Energy from the biomass is the oldest fuel used by humans. Biomass continued to be major sources of energy for human beings through history. More than 1 billion people in the world still use wood as their primary source for heating and cooking. Today in developing countries, biomass provides 35% of the total energy supply. Energy from the biomass can take several routes: direct burning of biomass, heating of biomass to form gaseous fuel; processing of biomass to produce biofuels such as ethanol, methanol or methane.

The use of the biomass fuels can pollute the air and degrade the land. The environmental impacts of burning wood include deforestation, soil erosion, water pollution and air pollution.

Biomass energy in its various forms appears to have a future as an energy source. It is flexible, because it can be stored and this allows to be used as needed to meet demands.

Water power

This renewable energy sources is the most used sources for energy today. But like very renewable energy source it has advantages and disadvantages. Water power is clean power; it requires no burning of fuels and it does not pollute the atmosphere, produces no radioactive or other waste and it is efficient. However there are some environmental prices to pay, like: building water power plant can destroy many agricultural lands, dams block the migration of some fish, loss of the wild rivers, disturbance of the ecosystems and sediment trapped in reservoirs.

Conclusions

As the human population continues to increase, so does total world demand for energy. Environmental problems related to increased consumption of fossil fuels could be minimized through controlling human population, increasing conservation efforts and using those alternative renewable energy sources that do not harm the environment.

Alternative renewable energy sources have a future in our urban environment. For example, the roofs of buildings can be used for solar collectors of photovoltaic systems.

We are seriously considering renewable energy sources today, because we value environmental quality. Recognizing that burning fossil fuels creates many serious environmental problems, we are trying to increase our scientific knowledge and improve our technology to produce energy supplies to meet our needs for the future while minimizing pollutions. Our present science and technology can produce sustainable energy future, but we need to change our values and our behavior to achieve it.

Renewable energy requires a broad energy policy that takes long-term view. Policy issues include this:

- Encouraging and funding renewable energy research and development;
- Ensuring fair access to the renewable energy sources;
- Developing planning initiatives that promote environmentally preferred and socially acceptable renewable energy;
- Establishing industrial training programs to retrain employees in renewable energy industries, especially in rural agricultural regions and former coal mining communities;
- Encouraging funding institutions to support community to invest in renewable energy;

Source	Resource Base (TW)*	Recoverable Resource (TW)
Solar	90000	1000
Wind	300-1200	10
Water	10-30	2
Biomass	30	10

Fig. 4. *Global resource based and recoverable energy for renewable energy sources*

*1TW=10¹²W

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