ALTERNATIVE ENERGY TO ENSURE SUSTAINABLE DEVELOPMENT

Alias Naser Ibraheem
Sumy State University, Sumy, Ukraine

Alternative energy sources can produce power without wearing out the source. Sustainable sources are continually renewed. In addition to using sustainable energy forms, people need to practice energy conservation, reduce waste and improve energy efficiency. This will decrease the impact of our energy use on the environment in order to have a future with a clean earth, and to have power whenever we need it [1].

Solar energy. Solar power uses the sun's rays to produce electricity and heat. Using Photovoltaics, electricity is made directly from the sun's rays, while in Solar Thermal power the heat of the rays is used. Photovoltaics currently relies on three technologies. Monocrystalline and polycrystalline cells are silicon-based. Thin-film cells use semi-conductor materials. Photovoltaic cells in modules are connected to make arrays. Solar power from photovoltaics has a high initial cost in the production process and in CO2 emissions, but low running costs and a long life. With improving technology, the monetary cost of solar power is decreasing. Solar energy is sustainable [2].

Wind energy. Wind energy makes electrical or mechanical power. Wind moves two or three blades mounted on tall towers to drive turbines that create electricity. Each turbine can produce 600-1000 kW (1 megawatt), of electricity, enough to supply 600-1000 homes. Grouped together, several turbines form a wind farm. New technology has improved power output of turbines up to 2.5 MW. Variable speed turbines increase equipment life. Turbines can be placed offshore to take advantage of ocean winds and to reduce environmental impact. Offshore energy can then be stored in batteries or used to make hydrogen. Wind energy is a sustainable form of energy [3]**.**

Wave Power. Compared to other forms of renewable energy production such as wind turbines, the development of ocean and wave energy has barely begun. But there are some operating systems in Europe, and the theoretical potential of this clean, inexhaustible form of energy is enormous - experts estimate that 0.2 percent of the ocean's untapped energy could power the entire world. Wave Power is a sustainable form of energy supply [2].

Hydropower.Hydropower uses the energy of falling water to make electricity or mechanical energy. As water falls a vertical distance (the "head"), the potential energy of that fall is released. Hydropower can be made at large dams or small weirs. It can even be produced in rivers using the natural flow of the water [3]. The advantages of hydropower include low maintenance costs.

Tidal Power. The tide moves a huge amount of water twice each day, and harnessing it could provide a great deal of energy. A major drawback of tidal power stations is that they can only generate when the tide is flowing in or out - in other words, only for 10 hours each day. However, tides are totally predictable, so we can plan to have other power stations generating at those times when the tidal station is out of action. Tidal energy is renewable. The tides will continue to ebb and flow, and the energy is there for the taking, tidal power is sustainable [1].

Geothermal energy. Geothermal energy comes from the heat of the earth. Radioactive decay in the earth's crust and volcanoes make heat. Deep wells, up to 4500 meters deep, are drilled into hot dry rock, hot water or steam sources. The heat is then used directly, in heat pumps or as steam to drive turbines to make electricity. Some of the problems with geothermal energy include air pollution from radon gas, hydrogen sulfide, methane and ammonia. Mineral deposits also harm geothermal equipment. Geothermal sources are found all over the world and supply reliable, inexpensive power. Depending upon the source and methods, geothermal energy can be a sustainable form of energy [4].

Biomass Energy. Biomass power is the process of making energy from plant and animal matter. Industrial wastes such as sugar cane stalks, sawdust, straw and organic material, as well as energy crops like sugar cane, corn and trees can be turned into fuel. The original material can be burned directly, gasified, biologically, or chemically converted to biogas or other fuels. Energy made from biomass often makes less pollution than fossil fuel power. Unfortunately, Biomass energy can not replace our dependence on oil as it is not a sustainable form of energy.

Hydrogen energy. Hydrogen energy is made when hydrogen molecules combine with oxygen, producing water and heat in a chemical reaction. Efficiency of hydrogen energy can be up to 80%, especially when the extra heat produced is also used. Whether Hydrogen energy supply can be sustainable remains controversial and it is an area that needs greater research funding [1].

References

1. Phylipsen, G.J.M., Blok, K., Worrell, E., 1997. Handbook on International Comparison of Energy Efficiency in the Manufacturing Industry. Utrecht,Netherlands: Utrecht University, Dept. of Science, Technology, and Society.

2. Posch, M., Hettelingh, J.-P., de Smet, P.A.M., Downing, R.J., eds, 1999. Calculation and Mapping of Critical Thresholds in Europe. Status Report 1999, Bilthoven, the Netherlands: Coordination Center for Effects (CCE), National Institute of Public

Health and the Environment (RIVM).

3. Priddle, R., 2002. A New Perspective on Energy Security. Paper presented at the 25th Annual IAEE Conference, 26–29 June, Aberdeen, Scotland.

4. Samaras, Z., et al., 1999. Study on Transport Related Parameters of the European Road Vehicle Stock. Prepared for Eurostat and DG-7. Thessaloniki, Greece:Laboratory of Applied Thermodynamics, Aristotle University.