Look Up and See the Light

As fossil fuels wane, petroleum prices skyrocket, and pollution begets environmental hazards, the world increasingly relies on engineers to contrive safe, clean methods of energy generation. Humans depend on energy for a myriad of activities. Energy is used to heat buildings and water, cook food, fuel automobiles, produce light, and run computers. The world marketed energy consumption is predicted to increase by 57 percent between 2004 and 2030.[1] The growing population, coupled with the increasing dependency on energy, has outlined the path that engineers must pursue. The sun has illuminated that path; the lucid focus of engineers should be to harness solar energy and improve methods of applying it.

The availability of solar energy in the environment is immense compared to human energy needs. The total solar energy available to the earth is about 3850 zettajoules (ZJ) per year.[2] In 2004, worldwide energy consumption was merely 0.471 ZJ.[3] Even with the anticipated increase in energy usage, the amount of solar energy available will continue to greatly exceed global energy needs. The underlying advantage of solar energy is that it is free, abundant, and inexhaustible. Additionally, harnessing solar energy for work produces no pollution. The combustion of fossil fuels gives rise to smog and contributes to global warming. Contrarily, the utilization of solar power has no negative environmental effects.

Developing solar energy technologies should be the focus of engineering. There are countless applications of solar energy, spanning through the commercial, industrial, agricultural, residential, and transportation sectors of the economy. Solar energy applications can be divided into three basic categories: heating/cooling, electricity production, and chemical processes. Solar energy can be used to heat buildings, water, and air.[4] Solar thermal technologies can also be used

to drive chemical reactions, melt metals, cook food, distill water, and produce process heat for drying food and clothes. Photovoltaic (PV) cells can generate electricity. Cars can exploit solar energy for running power. Clearly, solar energy has the potential to fuel a wide variety of applications.

Critics may complain of the expensiveness of using solar power. However, due to economies of scale, solar panels actually become cheaper as people buy and use more of them. Also, a new "thin film" technology is being developed by the Californian company Nanosolar. In December 2007, Nanosolar's manager in Switzerland, Erik Oldekop, announced, "We aim to produce the panels for 99 cents a watt, which is comparable to the price of electricity generated from coal."[5] If one considers the negative externalities of burning fossil fuels and the rising petroleum prices, it is manifest that solar power is a viable proposition.

Other detractors lament the huge amount of space that would be needed to set up the large number of solar panels needed to capture an adequate amount of energy. Some critics may point out that certain parts of the world are unsuitable for solar power generation and that solar energy is not available at night.[6] What these critics may not realize is that, since sunlight is much more abundant in space than it is on Earth, solar power satellites (SPS) could be placed in geostationary orbit. The SPS would collect solar energy and convert it to electricity and then to microwaves. The microwaves would be beamed at *rectenna* fields that would reconvert the microwaves into electricity and distribute the energy to users.[7] This system would eliminate the need for extensive land space for solar panels, and the SPS would improve the efficiency of solar power generation.

The "problems" with using solar power can easily be overcome if engineers concentrate their efforts on advancing solar technologies. Solar power is an abundant, inexhaustible, and free source of energy. Engineers must focus on perfecting current solar technologies as well as developing new techniques to harness the sun's power. The world is depending on the ingenious minds of current and future engineers to master the use of this safe and clean source of energy. Engineers must lift up their eyes to the sun so they can provide for the world's energy needs. The sun is shedding light on the future of engineering.

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[2] "Solar Energy." 25 February 2008. Wikipedia.com. Accessed 01-15-08. http://en.wikipedia.org/wiki/Solar_energy#_note-sun1.

[3] Official Energy Statistics from the U.S. Government. "International Energy Outlook 2007." May 2007. Energy Information Administration. Accessed 01-03-08. http://www.eia.doe.gov/oiaf/ieo/highlights.html.

[4]Canadian Renewable Energy Network. "About Solar Energy." Modified 2005-04-26. Accessed 01-13-08. http://www.canren.gc.ca/tech_appl/index.asp?CaId=5&PgId=121.

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[7] Dr. Seth Potter. New York University. "Solar Power Satellites." December 27, 1998. Accessed on 01-28-08. http://www.freemars.org/history/sps.html.

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