Concentrated Solar: Raising It to the Next Level

Noonan, Andrew

There are areas of the world where energy is scarce, and access to clean drinking water is limited. After successfully manufacturing a single parabola concentrated solar system last year, design changes were made to make the system more efficient, self-contained, and having the ability to sterilize water by taking advantage of ultra-high UV light. Numerous attempts were made to create the optimal cell configuration. In solar cells, the cell producing the least amount of energy limits all other cells in the system. Diodes added to the cells eliminated this constraint. Have the control at the same level as the concentrated cells. Measure with a multi-meter the voltage and amperage output of the solar cell. Turn on the cooling system for the cell. Verify that output water is contained. Turn on the self designed tracking software ensuring proper operation. Ensure concentration of the sun onto cells, both bottom and sides. Measure the voltage and amperage output of thermal conversion unit for baseline. Measure the voltage and amperage output of the solar cell. Take amperage and voltage reading of the conventional solar cell. Take amperage and voltage measurements of thermal to electric conversion unit. The double parabola doubled the power output compared to the single parabola. The biggest cost of a solar cell is the silicone cell. The experimental cell utilizes 94% less silicone than a conventional cell. This will make the system affordable to supply renewable energy to a wide group of people. The additional energy of hot water can be used as a radiant heat system. System will be installed summer of 2014 in the Dominican Republic to provide electricity and clean drinking water to areas that require these things because of a lack of infrastructure.

Awards Won: