Improvement of solar thermal collector

Proposal for Improvement of Solar Thermal Collectors Fresnel lenses are the ical lighthouse light design. They are able to use lessmass to capture light more obliquely. I propose using Fresnel lenses in an isolated vessel to absorb more light and reduce thermal loss. The project will begin with simulation to find the best design dimensions and determine initial plausibility. This software simulation can likely be done exclusively with available and off-the-shelf electronics and software, but may need slight proprietary modification; there should be no need for elaborate custom software. Once the best design dimensions are created, anywhere from two to ten prototypes will be built and tested. They will be tested under a variety of light conditions, trying to simulate a range of light beyond the normal expected use of solar panels. The hope would be that this design could, among other advantages, catch light that is more diffuse or at lower intensities, enabling a broader climactic range to employ the technology. There will also be stress testing of the prototypes to test for breaking scenarios and determine if durability is within acceptable parameters. Stress testing will include shaking, simulated geological turbulence, simulated barometric turbulence, falling, heavy weight to simulate snow and hail, and other tests. Parameters being tested for will include potential climactic range; efficiency; spectrums of light absorbed; durability under adverse weather conditions; durability under both normal and extreme circumstances; more compact size; and cost. Once initial testing is completed, flaws will be determined, simulation begun again, until the final working prototype is selected. A literature review shows that this project has promise. Cheshire Innovation uses Fresnel lenses in their solar desalination plants (Patent application Nos. 0511946. 6, 0608208. 5). McGrew's 1980 Patent No. 4, 204, 881 also has Fresnel lenses as an

alternate design element. Linear Fresnel relectors are already commonplace, and prototyps of Fresnel lens solar thermal collectors are already taking place (Green & Gold Energy, 2009; Mills and Graham, 2008; Mills, 2008). The 'Desert Bloom' project is also proposing the usage of a Fresnel technology. One of the problems with current technologies is a low climactic range (Gill, 2010). This is particularly true of the crystalline silicon models. Parallel to these concerns are the space concerns. To create more effective residential, commercial and industrial solar thermal collectors requires reduced space usage, which not only provides for more flexibility of installation but also increases effective climactic range. Fresnel lenses are cheaper than mirrors, and since they are flexible, there can be more variety in design and construction of the ultimate collector without risking a breakdown from load. Fresnel lenses also allow the minimization of ground surface area, including raising the lens of the ground, such as the SunCube design (Green & Gold Energy, 2009). Renewable energy is the project of the 21st century. Every new technology to enhance the viability of solar energy is another investment into a sustainable future. This project is currently on the cutting-edge, with others attempting the same feat but without having succeeded yet. A complete success would allow the increase of the rate of adoption of solar technology. Works Cited Cheshire Innovation. “ Latent Power, Solar Desalination Plant”. Patent application Nos. 0511946. 6, 0608208. 5 Gill, Jeena. “ Efficiency of Solar Panel”. August 18, 2010. Green & Gold Energy. “ Delivering clean, green SunCube™ 1, 370 sun CPV solar energy”. 2009. Retrieved 3/15/2011 from Land Art Generator Initiative. “ Desert Blooms”. Retrieved 3/15/2011 from U. S. Patent No. 4, 204, 881.