Middle School Clean Tech Awards:

Region II: Central MA

Adi Panchamoorthy and Alex Gribov, Advanced Math and Science Academy, Marlborough

"*Homemade Solar Cells Efficiency*"

Adi: My name is Adithyan Panchamoorthy. I am currently a 7th grade student at AMSA Charter School in Marlborough, Massachusetts. My interests include playing sports, such as baseball and soccer. I also enjoy other extracurricular activities such as playing piano and participating in speech and debate clubs. My interest in current events has helped me to place 6th in the National Current Events League tournaments in 2004-05. My favorite hobby is to read, and I have had the wonderful opportunity to author two hardcover books, one each in third and fourth grade.

My major interest lies in improving my mathematical skills so that I could become a world-renowned architect one day. I sincerely hope that the clean tech award will be my first step to achieve my goal.

OUR PROJECT:

The worldwide demand for energy is increasing dramatically every year. By conservative estimates, the demand for energy is projected to more than double by 2050, to 27 terawatts. Most of today's energy production comes from the burning of fossil fuels, a non-renewable energy source which takes millions of years to form. Burning of fossil fuels also leads to increases in infra-red (heat) adsorbing gasses such as CO2 in the atmosphere, resulting in global warming. So that brings us to ask, where can we find a renewable energy source that is infinite and safe to the environment? The answer to that lies in the use of solar energy.

However, solar energy does not magically "poof" electricity into everything, and instead requires a photovoltaic device called a solar cell to convert the energy into usable electricity. That is where the disadvantage lies, since solar cells are very expensive. However, in the world of Research and Development, engineers are working hard to get solar power costs down, and have set a goal of being price-competitive with fossil fuels within the next 20 years. To achieve this goal, different methods are being used to create new types of solar cells. In an effort to contribute to this invaluable goal, we have set out to study the efficiency of homemade solar cells.

We hypothesized that the homemade solar cells will have less efficiency than manufactured ones for the same cell surface, due to the fact that we are building them with non-factory materials. However, we believe that our cells will have enough efficiency to complete most tasks that the manufactured

cell can complete. We intended to build our solar cells with common items, and compare their efficiency in power and usability.

In order to measure the efficiency of homemade solar cells, we measured the voltage generated by homemade solar cells compared to a factory-made solar cell. Velocities of a small plastic car powered by homemade solar cells as compared to a factory-made solar cell were tested. Finally, the efficiency of homemade solar cells vs. a factory-made solar cell was tested using a light bulb.

The results indicated that our homemade solar cells were not comparable to the factory-made cell in terms of voltage. Since the voltages obtained were very low, none of our homemade solar cells were able to light the bulb or power the plastic car, while the factory-made cell could light the light the light bulb, but could not run the car. That brings us to the conclusion that our hypothesis proved partially correct with respect to the fact that the homemade cells were less efficient. We would like to attribute this to the fact that materials used to build our homemade solar cells were much less refined than those of the factory-made cell. Also, some of the materials used, like Titanium Dioxide and Iodine were not available in the purest form.

We would like to further our experimentation of homemade solar cells by using pure, nanocrystalline Titanium Dioxide and pure Iodine to make our solar cells and improve their efficiency. If proven effective, homemade solar cells will be a much sought after choice for an alternative energy source because they are inexpensive and easy to make. We hope that our small endeavor will contribute a drop to the enormous problem of global warming.