R-8003

Lead Inventors: Lin-Shu Wang, Ph.D., Associate Professor, Department of Mechanical Engineering

Title: Hybrid Solar Panel

Background: When compared to non-concentrated photovoltaic cell technology for solar energy collection, concentrated photovoltaic cell (CPV) technology can offer more than double the conversion efficiency. CPV technology use relatively inexpensive optics, such as mirrors or lenses, to "concentrate" or focus light from a relatively broad collection area onto a much smaller area of active semiconductor photovoltaic material. CPV systems need to be pointed directly at the sun because they work by focusing sunlight onto a targeted area and therefore requires trackers to follow the sun's trajectory. Since CPV systems require less semiconductor material to capture a given amount of sunlight, expensive and higher efficiency cells can be utilized and still be cost effective.

CPV technology offers an effective, practical way to keep solar cell conversion efficiencies high while keeping semiconductor material costs down.

Although the existing CPV technology is very promising, it does have one major drawback: it only converts direct sunlight, leaving about half of the 'diffuse' sunlight unutilized.

Technology Description: Through his extensive research efforts, Professor Wang has developed an apparatus and method for improving the solar collection efficiency by capturing the previously wasted 'diffuse' sunlight as radiant heat thereby increasing the overall performance efficiency of the concentrated photovoltaic cell. Through his proposed hybrid design, a huge gain in efficiency can be realized thus making CPV based systems even more financially attractive. Implementation of these novel design principles will undoubtedly help in enabling solar energy to become a viable, cost effective alternative energy source.

Applications: Residential solar panels, commercial solar panel farms

Advantages: Significant increase in solar power efficiency

Patent Number / Publications: Patent Pending

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