

Rectenna Solar Energy Harvester

Researchers at the University of South Florida have utilized rectennas for solar energy harvesting for the production of electric power.

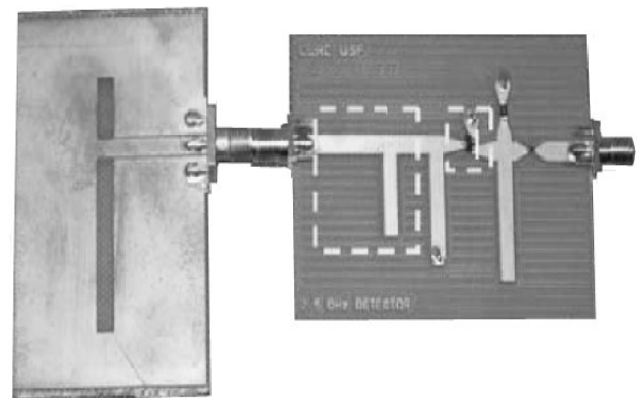
Approximately 80% of the world's power is generated by fossil fuel combustion. In the United States, more than 90% of greenhouse gas emissions come from the combustion of fossil fuels. Combustion also produces other pollutants such as compounds of nitrogen oxide, sulfur dioxide and other volatile organic compounds. The cost of producing energy has risen, due in part to depleting fossil fuel reserves. Therefore, to keep pace with future energy demands, there is a need for clean and renewable energy sources. A rectenna is a combination of an antenna and a rectifier. In the past, rectennas have been used to directly convert microwave energy to electricity. However, because of limitations in nanotechnology fabrication, it has not been possible to develop rectennas that can operate in the visible range.

Inventors at USF have devised rectennas that are able to operate in the infrared frequency range and the invention leverages this idea for energy harvesting. To utilize the entire solar spectrum, the first rectenna converts solar energy to thermal energy by a variety of methods. Such methods include, heating of a black surface, using a number of solar collectors used for trapping the sun's energy. The large area rectenna is placed underneath the collecting surface or in front of the emitting surface for the direct conversion of thermal (infrared) energy to electricity.

ADVANTAGES:

- Employed for solar energy harvesting
- Converts solar energy to electric power
- Increases efficiency of solar panels
- Efficiency of thermoelectric device is enhanced

Rectennas Operate in the Visible Frequency Range



Rectenna Device Using Dipole Antenna Design

Tech ID #: 08A041

Patent #: [8,115,683](#)