

# SOLAR BATTERY

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**ABSTRACT:** Most of the devices used across the world face a problem of deficiency of energy. It affects the performance of machine. To overcome this problem researchers across the world decided to develop a source which could provide energy continuously as long as possible. With this goal in mind a team of researcher in Ohio University, USA successfully developed an energy source which generates its own power. They claim to develop a battery which can generate its own energy by just using sunlight. Although the experiment is done on a small scale but they have guaranteed that in future the batteries will be capable of generating more power. It means that the devices with limited power supply will be able to work for many days without exhausting. Researchers said the key to the innovation is a mesh solar panel, which allows air to enter the battery, and a special process for transferring electrons between the solar panel and the battery electrode. Inside the device, light and oxygen enable different parts of the chemical reactions that charge the battery. The state of the art technology has been placed in to use a solar panel to capture the light, and then use a cheap battery to store the energy. They have integrated both functions into one device. The invention also solves the longstanding problem of solar energy efficiency, by eliminating the loss of electricity that normally occurs when electrons have to travel between a solar cell and an external battery. With that being done, people across the world are waiting for this technology to be utilized fruitfully.

## I. INTRODUCTION

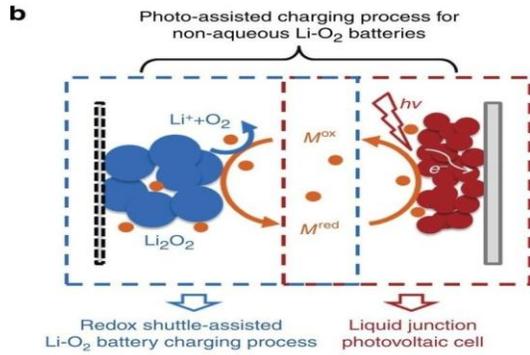
A solar cell with a built-in rechargeable battery has been developed for the first time by researchers at Ohio State University. The device, which will be licensed to the renewables industry, will reduce costs associated with solar energy by 25%, making the already booming market even more cost-effective. Researchers say that this cost saving is a result of combining the solar cell and battery in one unit. The state of the art is to use a solar panel to capture the light, and then use a cheap battery to store the energy. We have integrated both functions into one device.

Any time you can do that, you reduce cost. At present the process of transferring solar energy to an external battery results in significant loss, with only 80% of electrons making the journey, however this hybrid system will bring the number to almost 100%. The improvement could boost the use of solar in applications where storing energy for use later is important, such as streetlights, as well as in countries where sunny weather is intermittent. The key to the technology is the use of air the solar panel is made of mesh to enable air to enter the battery, which aids charging. Basically, it's a breathing battery. It breathes in air when it discharges, and breathes out when it charges. The introduction of mesh was essential to this process: air is normally blocked from entering solar panels because they are made of solid semiconductor panels. The mesh solar panel was developed using flexible titanium gauze, which researchers grew vertical titanium dioxide rods from. While the rods capture sunlight, the air can still flow freely, enabling the charging process to work.

## II. WORKING

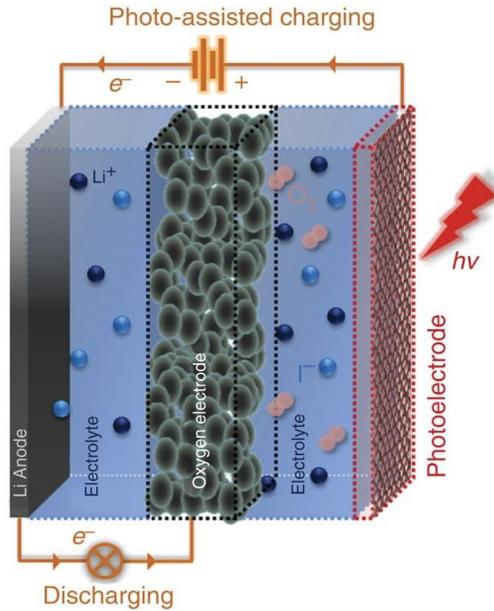
Solar battery is typically a mesh solar panel which consists of a battery and a solar panel in one hybrid device. The mesh solar panel forms the (first electrode). Beneath, the researchers placed a thin sheet of porous carbon (the second electrode) and a lithium plate (the third electrode). Between the electrodes, they sandwiched layers of electrolyte to carry electrons back and forth. A mesh solar panel form titanium gauze, a flexible fabric upon which it grew vertical rods of titanium dioxide like blades of grass. Air passes freely through the gauze while the rods capture sunlight. It allows the free flows of air and a new technique for charging and discharging. In the solar battery oxygen and sunlight are required, they work to enable multiple reaction that take place to charge the battery. Normally, connecting a solar cell to a battery would require the use of four electrodes, the researchers explained. Their hybrid design uses only three.

III. CONCLUSION



During charging, light hits the mesh solar panel and creates electrons. Inside the battery, electrons are involved in the chemical decomposition of lithium peroxide into lithium ions and oxygen. The oxygen is released into the air, and the lithium ions are stored in the battery as lithium metal after capturing the electrons. When the battery discharges, it chemically consumes oxygen from the air to re-form the lithium peroxide. An iodide additive in the electrolyte acts as

New solar Photovoltaic (PV) installations have grown globally at a rapid pace in recent years. We provide a comprehensive assessment of the cost competitiveness of this electric power source. Based on data available for the second half of 2011, we conclude that utility-scale PV installations are not yet cost competitive with fossil fuel power plants. In contrast, commercial-scale installations have already attained cost parity in the sense that the generating cost of power from solar PV is comparable to the retail electricity prices that commercial users pay, at least in certain parts of the U.S. This conclusion is shown to depend crucially on both the current federal tax subsidies for solar power and an ideal geographic location for the solar installation. Projecting recent industry trends into the future, we estimate that utility-scale solar PV facilities are on track to become cost competitive by the end of this decade. Furthermore, commercial-scale installations could reach “grid parity” in about ten years, if the current federal tax incentives for solar power were to expire at that point.



a "shuttle" that carries electrons, and transports them between the battery electrode and the mesh solar panel. The mesh belongs to a class of devices called dye-sensitized solar cells, it used a red dye to tune the wavelength of light it captures. Coating the mesh with rust enabled the battery to charge from sunlight while retaining its red color.

