

New battery could lead to cheaper, more efficient solar energy

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A joint research project between the University of Southampton and lithium battery technology company REAPsystems has found that a new type of battery has the potential to improve the efficiency and reduce the cost of solar power.

The research project, sponsored by REAPsystems, was led by MSc Sustainable Energy Technologies student, Yue Wu and his supervisors Dr Carlos Ponce de Leon, Professor Tom Markvart and Dr John Low (currently working at the University's Research Institute for Industry, RIfI). The study looked specifically into the use of [lithium batteries](#) as an [energy storage device](#) in photovoltaic systems.

Student Yue Wu says, "Lead acid batteries are traditionally the energy storage device used for most photovoltaic systems. However, as an energy storage device, lithium batteries, especially the LiFePO_4 batteries we used, have more favourable characteristics."

Data was collected by connecting a lithium [iron phosphate](#) battery to a [photovoltaic system](#) attached to one of the University's buildings, using a specifically designed battery management system supplied by REAPsystems.

Yue adds, "the research showed that the lithium battery has an [energy efficiency](#) of 95 per cent whereas the lead-acid batteries commonly used today only have around 80 per cent. The weight of the lithium batteries is lower and they have a longer [life span](#) than the lead-acid batteries

reaching up to 1,600 charge/[discharge cycles](#), meaning they would need to be replaced less frequently."

Although the battery will require further testing before being put into commercial photovoltaic systems the research has shown that the LiFePO_4 battery has the potential to improve the efficiency of solar power systems and help to reduce the costs of both their installation and upkeep. Dr Carlos Ponce de Leon and Dr. John Low now plan to take this project further with a new cohort of Masters students.

Dr Dennis Doerffel, founder of REAPsystems and former researcher at the University of Southampton, says: "For all kinds of energy source (renewable or non-renewable), the energy storage device - such as a battery – plays an important role in determining the energy utilisation. Compared with traditional lead acid batteries, LiFePO_4 batteries are more efficient, have a longer lifetime, are lighter and cost less per unit. We can see the potential of this battery being used widely in photovoltaic application, and other renewable energy systems."

Provided by University of Southampton

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