UNSW Confirms that SolarEdge's DC Optimised Technology Can Harvest Over 15% More Energy from Solar Arrays than Conventional String Systems.

June, 2025

The Research Project

The University of New South Wales (UNSW), through the School of Photovoltaic and Renewable Energy Engineering (SPREE), has studied the additional energy yield provided by Module Level Power Electronics (MLPE) compared to a string-based Maximum Power Point Tracking (MPPT) topology.

The team—Professor Ziv Hameiri, Dr Baran Yildiz, and Mr Sijin Wang (a PhD candidate)—working in collaboration with SolarEdge Technologies, obtained real-world data sets from several regions, including Australia, North America, Germany, the Netherlands, and France, to analyse the nature of Energy Generation Difference (EGD) at the module level more than 450 modules were investigated during periods around both equinoxes and solstices, ensuring the full annual variations were captured.

The data sets comprised the solar module output parameters, including module voltage and current values, as well as ambient air temperatures, recorded at 5-minute intervals. For each module, more than 6,000 telemetry points per year were used. These data were used to reconstruct the current-voltage (I–V) curve and determine the maximum power point at the module level.

To reconstruct the I–V curve, the one-diode model method was adopted, which is recognised as industry best practice (as part of the study, the errors associated with this model were estimated in comparison with the two-diode model). Modules showing activated internal bypass diodes were excluded, leading to more conservative variance estimates. Of the global sites selected, 72% had arrays with a single orientation, and 72% had no intermittent shading during the sample period.

The study concluded that more than 15% more energy could be generated from arrays with MLPE when compared with a single MPPT string.

Project Outcome

What this analysis confirms is that when solar arrays use SolarEdge DC Optimisers, the system can harvest over 15% more energy.

- *15%+ Global Energy Generation Difference (EGD) value (no shading)*
- *22%+ Energy Generation Difference in sites with high temperatures and high levels of humidity*
- *16%+ Energy Generation Difference in humid locations*
- *18%+ Energy Generation Difference in locations with intermittent shading*
- *17%+ Energy Generation Difference in winter periods*

The full academic journal submission will be lodged in the coming months, which will clarify the methodology used in detail and will illustrate more extensive findings.

UNSW School of Photovoltaic & Renewable Energy Engineering

The UNSW School of Photovoltaic and Renewable Energy Engineering (SPREE) is internationally recognised for its record-breaking research in solar power (photovoltaics) and renewable energy. The PERC solar cell was first invented in SPREE's laboratories in 1983 and, until recently, powered more than 85% of all new solar PV modules worldwide. SPREE's work and people have changed the face of sustainable energy on the global stage and continue to be at the forefront of cutting-edge research and development in renewable technologies as economies transition away from fossil fuels.

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Source: SolarEdge Technologies, Australia Pty Ltd.