

Scientists develop automatic and portable cleaning system for solar panels

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Research in the [*International Journal of Power and Energy Conversion*](#) outlines an approach to cleaning photovoltaic (PV) solar panels to ensure they operate at maximum power-generation efficiency. The automatic and portable cleaning system, which can be adapted for different panel sizes is designed to combat efficiency reduction of up to 40% caused by the accumulation of dust on the sunlight-absorbing upper surface of PV

panels. Dust and dirt accumulation have always been a significant problem undermining the performance of PVs.

Fulton Carlos Reategui-Ordoñez, Fernando Paredes Marchena, Juan Eduardo Reategui-Ordoñez, Hugo Guillermo, and Jimenez Pacheco of the Universidad Católica de Santa María in San José, Perú, focused on the impact of climate variations on PV cleanliness. They found that [dust](#) accumulation led to a remarkable reduction in panel efficiency with a fall of more than 11% and sometimes a peak reduction of 39.6% occurring during maximal incident sunlight.

They add that a panel's fill factor (FF), a critical indicator of efficiency, drops significantly if a panel is coated with dust or otherwise dirty. Dust accumulation is, of course, dependent on local conditions and so an automated cleaning system would be most useful in some regions more than others.

Manual cleaning or relying on natural weather conditions are not optimal solutions and so the team has developed an automatic cleaning system that can consistently restore a panel to near-pristine conditions and so maximize efficiency. The system would be relatively easy to install and utilizes a computerized controller to time cleaning and a microfiber cloth to remove dust without scratching the panel.

More information: Fulton Carlos Reategui Ordoñez et al, Automatic and portable cleaning photovoltaic solar panels mechanism, *International Journal of Power and Energy Conversion* (2023). [DOI: 10.1504/IJPEC.2023.133629](https://doi.org/10.1504/IJPEC.2023.133629)

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