

Autonomous Solar Panel Cleaning Robot

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Abstract: *The dust particles accumulating on the solar panels will prevent the solar energy from reaching the solar cells, thereby reducing the overall power generation. Power output is reduced as much as by 50%, if the module is not cleaned for a month. In order to regularly clean the dust, an automatic cleaning system which removes the dust on the solar panel is developed. In this paper, the problem is reviewed and the method for dust removal is discussed. A robot cleaning device is developed and it travels the entire length of the panel. A PIC microcontroller is used to implement robots control system. The robot provided a favorable result and proved that such a system is viable by making the robotic cleaning possible, thus helping the solar panel to maintain its efficiency.*

Keywords: Security, net metering, and smart grid

REFERENCES

- [1]. M. F. Yaakub, et al., "Prospective study of power generation from natural resources using hybrid system for remote area," Indonesian Journal of Electrical Engineering and Computer Science, vol. 18, no. 2, pp. 642-647, 2020.
- [2]. S. R. Hunter, et al., "Low-cost anti-soiling coatings for CSP collector mirrors and heliostats," High Low Concentrator Systems for Solar Energy Applications IX, vol. 9175, p. 91750J, 2014.
- [3]. M. A. Bahattab, et al., "Anti-soiling surfaces for PV applications prepared by sol-gel processing: Comparison of laboratory testing and outdoor exposure," Solar Energy Materials and Solar Cells, vol. 157, pp. 422-428, 2016.
- [4]. Y. Y. Quan and L. Z. Zhang, "Experimental investigation of the anti-dust effect of transparent hydrophobic coatings applied for solar cell covering glass," Solar Energy Materials and Solar Cells, vol. 160, pp. 382-389, 2017.
- [5]. M. Sakhuja, et al., "Outdoor performance and durability testing of antireflecting and self-cleaning glass for photovoltaic applications," Solar Energy, vol. 110, pp. 231-238, 2014.
- [6]. Q. F. Xu, et al., "An Anti-Reflective and Anti- Soiling Coating for Photovoltaic Panels College of Staten Island and Graduate Center of the City University of New York," in Advanced Materials: TechConnect Briffs 2015, pp. 624- 627, 2015.
- [7]. K. Midtdal and B. P. Jelle, "Self-cleaning glazing products: A state-of-the-art review and future research pathways," Solar Energy Materials and Solar Cells, vol. 109, pp. 126-141, 2013