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NON-SPECIALIST LECTURE: Characterising Photovoltaic Modules for Performance, Reliability, and Sustainability

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Photovoltaic (PV) module characterisation plays an important role in understanding and optimizing the performance of solar PV energy systems. By rigorously analysing various parameters such as power output, efficiency, temperature dependence, spectral response, degradation mechanisms and failure rates researchers can fine-tune PV modules and systems for maximum energy output and durability. This characterisation process not only ensures reliable operation under diverse environmental conditions but also facilitates the development of more efficient, cost-effective and location appropriate PV technologies. In addition, it supports standardisation in efforts across the industry to facilitate comparisons between different module types and different deployment locations. Ultimately, robust characterisation enhances the overall reliability, performance, and longevity of PV systems. This advances their widespread acceptance, adoption and contribution to the Just Energy Transition to sustainable energy solutions globally. This paper introduces PV cell and module technology and highlights key standardised laboratory characterisation and in-field characterisation methods used on various PV systems ranging from domestic to utility-scale PV power plants.

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None

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