

## **[Keynote Speaker]: Enhancing the Performance of a Photovoltaic Module Using Different Cooling Methods**

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**Abstract :** Temperature effect on the performance of a photovoltaic module is one of the main concern that face this renewable energy, especially in the hot arid region, e.g United Arab Emirates. Overheating of the PV modules reduces the open circuit voltage and the efficiency of the modules dramatically. In this work, water cooling is developed to enhance the performance of PV modules. Different scenarios are tested under UAE weather conditions: front, back and double cooling. A spraying system is used for the front cooling whether a direct contact water system is used for the back cooling. The experimental results are compared to a non-cooling module and the performance of the PV module is determined for different situations. A mathematical model is presented to estimate the theoretical performance and validate the experimental results with and without cooling. The experimental results show that the front cooling is more effective than the back cooling and may decrease the temperature of the PV module significantly.

**Keywords :** PV cooling, solar energy, cooling methods, electrical efficiency, temperature effect

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