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WIND EFFECTS ON ROOF-MOUNTED SOLAR PANELS

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ABSTRACT

Impressive global attitudes towards reducing the pressure on current non-renewable energy sources like carbon-producing fuel sources (coal and oil) have recently progressed toward sustainable and clean energy supply. Solar power, arguably the most accessible and prevalent application for renewable energy, becomes the focus of the world attention resulting in rapid applications of photovoltaic solar panels of various utility scale systems throughout the world. In particular, roof-mounted solar panels are used increasingly for commercial, industrial and residential applications. This paper presents a comparative study of wind loads on roof-mounted solar panels aiming to comprehend available findings and results obtained by means of atmospheric boundary layer wind tunnel studies. The main goal of this study is to create an opportunity to become familiar with the obstacles that hinder the reliable evaluation of wind loads on solar panels. These are lightweight structures and wind pressures on their surfaces may be critical and may affect their structural integrity. Suitable design guidelines are important for both manufacturers and designers to increase the solar panel's safety and reliability, which in turn may reduce the cost of financing for the installation of solar panels. In spite of the amount of research that has been conducted in an attempt to create code/standard provisions suitable for design of solar panels on building roofs, wind codes and standards provide emerging guidelines for limited geometries and configurations. Vast discrepancies were found within the range of available results and more forward-looking parametric studies will be indispensable to yield credible results for sustainable design and codification purposes.