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# COMPARISON OF MOST POPULAR BUILDINGS PERFORMANCE SIMULATION TOOLS

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**Abstract** – A critical procedure in sustainable building design is the building energy performance assessment, which has significant implications for global energy consumption and climate change. This study compares three simulation software programs for a photovoltaic system on a building's roof. The low-rise residential buildings in three East Mediterranean cities (Amman, Mafraq, and Aqaba) represent moderate drywarm, semiarid, and humid subtropical climate zones were compared using three simulation software programs (IES-VE, DesignBuilder, REVIT) for a typical building with PV on the roof and the second scenario without a PV system installed on the roof. This investigation aims to evaluate the shading effect of the PV system on a building's roof structure by calculating the total electrical load required to maintain thermal comfort inside the building. The final results showed significant discrepancies between the three software for the base building design and the PV system on the roof, with a range of around 50 %. This highlights the importance of evaluating and calibrating different simulation tools and using them with a great deal of caution.

**Keywords** – *Buildings simulation; DesignBuilder; East Mediterranean; IES-VE; PV; REVIT*