

A BIPV demonstration building: On-site system monitoring and simulation based investigation for annual energy production prediction

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New technology saw tooth (PV) modules developed under the BFIRST project for building integration are installed in a residential building in Mons, Belgium. The new modules are named roofing shingles (RS) PV panels and they can replace the normal roof tiles to produce electrical energy. The RS modules they are installed on the south part of the building's roof with an inclination angle of 40°. The installation comprises of 57 RS modules of 32 monocrystalline Silicon cells each, and the total installed power of the system is 7.01 kWp. This study presents a simulation model setup to predict the energy production of the system before the installation and compare the predicted results with real on-site monitoring data. It is concluded that the results from the simulation agree with the monitoring results measured on site regarding the energy production of the system. Simulations showed that an air gap of 0.1 m is adequate to maintain low PV temperature and the monitoring results agree with this finding.

Keywords: *BIPV, BFIRST, Roofing Shingles, Photovoltaics, Solar Roof*