

عنوان مقاله:

Evaluation of the technical performance of a techno-economic-environmental optimized building façade integrated photovoltaic system

محل انتشار:

سی امین همایش سالانه بین المللی انجمن مهندسان مکانیک ایران (سال: 1401)

تعداد صفحات اصل مقاله: 5

نویسندگان:

;Hamed amini - M.Sc., University of Tehran, Tehran

;behrang sajadi - Associate Professor, University of Tehran, Tehran

;pouria ahamdi - Assistant Professor, University of Tehran, Tehran

خلاصه مقاله:

Implementing solar panels on the facade of a high-rise building as the outer layer of the wall or the window overhangs is one of the best ways to supply the significant share of energy consumption in the building with renewable energies. This paper intends to evaluate the technical performance of an optimum BIPV system implemented on the facades of a big office building. The energy modeling of the building and the thermal performance of the PV cells is conducted using Energy Plus after the techno-economic-environmental optimization of the BIPV system through the NSGA-II algorithm. According to the results, equipping all facades, especially the south facade, with a combination of different types of solar panels is justifiable. Based on the incident solar radiation to the surfaces, P-Si, a-Si, and CIS cells are chosen for facade panels, north overhang panels, and other overhang panels, respectively. It is concluded that using solar cells as the walls' outer layer without air gap does not lead to wall panels' temperature critical increase and consequently does not give rise to decreasing their efficiency remarkably. On the other hand, Using this implementation method increases the zone mean temperature by 0.3°C and occupants' thermal comfort by 33%. All in all, using PV panels on the facades of the building as the outer layer of walls and window overhangs not only decreases the energy consumption of the HVAC system by 16 percent but also increases the occupants' thermal comfort.

کلمات کلیدی:

Building integrated photovoltaic (BIPV), Multi-objective optimization, Thermal comfort, Energy production, PV cell temperature, EnergyPlus

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1468866>

