Advances in Civil Engineering

Hindawi

Special Issue on

Employing Smart Power Generation in Buildings

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Globally, the majority of energy consumption in the building sector is provided by fossil fuels, leading to greenhouse gas emissions and causing substantial pollution to the environment. Low thermally insulated building envelopes contribute to this high energy demand, and so displacing these envelopes is essential to limiting unnecessary consumption of energy.

Photovoltaic (PV) systems, which generate green power, can be included in buildings as a smart envelope. This inclusion of PV into the building can be addressed as building-integrated photovoltaic (BIPV) or building-applied photovoltaic (BAPV). BIPV and BAPV both generate electricity locally, which abates transmission and distribution losses, and can also influence building interior comfort. However, temperature and soiling can create an obstacle to harnessing smooth power from PV. Reduction of high temperatures from BIPV and BAPV can be mitigated using phase change materials (BIPV/BAPV-PCM), or air (BIPV/BAPV-Ta) or water flow (BIPV/BAPV-Tg). The introduction of anti-soiling coating on the top surface of the BIPV/BAPV can mitigate soiling issues. PCM also has the potential to be part of the building envelope and improve the building heating and cooling load.

This Special Issue will focus on collecting work related to the performance of PV, BIPV/BAPV, BIPV/BAPV-Tg, BIPV/BAPV-Ta, and PCM for windows and walls, anti-soiling coated PV performance, and PCM as energy storage for building. The Special Issue will compile state-of-the-art reviews, original research, case studies, and conceptual works.

Potential topics include but are not limited to the following:

- Zero/green/net-zero/ low-energy buildings
- First, second, and third-generation PV, BIPV, and BAPV systems
- Cooling of BIPV system using air, water, PCM, and nanofluids
- PCM as building envelopes to reduce energy demand
- Building information modelling (BIM) based building energy simulation
- Anti-soiling coating for BIPV/BAPV systems
- Reliability of PV systems
- Power electronics conversion for BIPV, BAPV

Authors can submit their manuscripts through the Manuscript Tracking System at https://review.hindawi.com/submit?specialIssue=892271.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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Submission Deadline
Friday, 15 October 2021

Publication Date
March 2022