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# Evaluation of potential benefits of solar photovoltaic shadings in Hong Kong

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## Abstract

Solar photovoltaic (PV) modules can not only generate electricity but also act as external shading devices of buildings. Solar PV shadings can effectively reduce the solar heat gain through windows, but might have a negative impact on the indoor daylight performance. Therefore, it is worth investigating the optimum design of solar PV shadings since the thermal, daylighting and power generation performance are closely integrated. In this paper, a numerical simulation model was utilized on the basis of Energyplus to investigate the energy saving potential of solar PV shadings with various tilt angles and orientations in Hong Kong. The results indicate that the optimum installation position for solar PV shadings is south facade with 30° tilt angle in order to maximize the electricity generation. However, considering the electricity savings from air-conditioning system and the increased electricity consumption for artificial lighting, it is recommended that solar PV shadings should be installed on a south facade with 20° tilt angle. Furthermore, the annual overall electricity benefits of solar PV shadings were compared with the widely used interior blinds. The results show that the well-designed solar PV shadings can achieve much more annual overall electricity benefits than interior blinds.

## Keywords

Building integrated photovoltaics (BIPV); Solar photovoltaic (PV) shading; Energy saving potential; Optimum design

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