Solar intensity map of a city helps guide the deployment of solar power generative capacity

Wenfa Ng

Citizen scientist, Singapore, Email: ngwenfa771@hotmail.com

Abstract

While solar insolation is abundant in the tropics, there remain areas in a city where cloud cover or tall buildings would affect solar irradiance at the ground level. Such information would naturally feed into the calculus for sitting solar farms or solar power generative capacity. Although leading edge solar photovoltaic technology is capable of maximising the amount of solar energy harvested such as through movable solar panels that follow the position of the sun in the sky, optimisation studies aimed at determining appropriate sites for solar power generative capacity remain a key concern both for policy makers and various stakeholders. To understand the amount of solar irradiance at particular areas such as in a city, a solar intensity map is indispensable. Such a map would highlight areas of the city that, on a statistical basis, enjoy stronger solar irradiance compared to other areas due, for example, reduced cloud cover or tree cover. Efforts to build such a map need not be bogged down by cost as relatively inexpensive Internet-connected light sensors could be deployed at various locations in a city such as the rooftops of high-rise apartment blocks, commercial or factory buildings. In a high density city, such deployment of light sensors would naturally garner data with a resolution able to inform policymakers about suitable sites in which solar panels could be placed to form solar power generative capacity. One possibility for high density cities with a sizeable population living in high-rise apartment blocks such as Singapore would be to deploy solar panels on rooftops of these apartment blocks. While such solar panel arrays could be deployed on rooftops of all high-rise apartment blocks, it could be envisioned that more expensive solar panels with better efficiency could be used in areas with lower solar intensity due to more frequent high cloud cover days. Hence, besides informing where to place solar panels, a solar intensity map built with information collected from a city-wide network of Internet-connected light sensors could also help guide the selection of solar panels with different efficiency for particular areas.

Keywords: solar intensity map, solar panels, rooftops, solar power generative capacity, high-rise buildings, cloud cover,

Subject areas: environmental engineering,

Conflicts of interest

The author declares no conflicts of interest.

Funding

No funding was used in this work.