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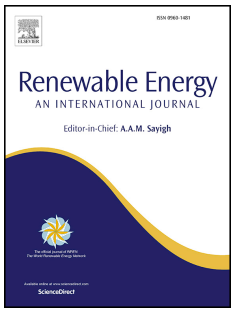

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Rooftop solar potential based on LiDAR data: Bottom-up assessment at neighbourhood level

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Abstract

Solar power has been rapidly growing in New Zealand with the total installed capacity increasing eightfold over the last three years. Most of the growth has taken place in the residential sector. Auckland Council has a goal of powering the equivalent of 176565 homes by solar photovoltaics by 2040. To assess this in number and size of solar installations we first need to assess the solar energy potential on Auckland rooftops. In this study we have used LiDAR data to develop a digital surface model of the city, including topography, buildings and trees. With this model a solar radiation tool has been used to calculate the annual solar radiation on each square meter of roof area, taking into account latitude, time of year, time of day, average climatic conditions, surface orientation and slope, and shading from nearby buildings and trees. Results show that some neighbourhoods are better suited for solar power deployment than others, due to the shape and orientation of roofs, and the absence of shading by nearby objects. The approach of this paper can be used to accurately estimate solar energy potential on existing building stock at the regional and municipal level, with direct application in policy design.

Keywords: LiDAR, solar potential, distributed energy policy

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