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PV Cell Angle Optimisation for Energy Arrival-Consumption Matching in a Solar Energy Harvesting Cellular Network

Doris Benda*, Xiaoli Chu*, Sumei Sun†, Tony Q.S. Quek† and Alastair Buckley*

* University of Sheffield, United Kingdom
† Institute for Infocomm Research - A*Star, Singapore
† Singapore University of Technology and Design, Singapore

E-mail: dcbenda1@sheffield.ac.uk, x.chu@sheffield.ac.uk, sunsm@i2r.a-star.sg, tonyquek@sutd.edu.sg and alastair.buckley@sheffield.ac.uk

Abstract—Despite the increasing interest in photovoltaic (PV) cell powered small-cell base stations (SBSs), it has not been sufficiently studied yet how different PV cell angles can be utilized to achieve a good match between the energy arrival and consumption at the SBS. This is especially important in an urban environment where cellular network operators often struggle to apply optimal angles to the PV cells due to implementation constraints or shadowing effects of surrounding buildings. We cellular networks due to their small physical footprint in dense built environments, technology maturity, low maintenance cost and production cost reduction in recent years [5].

Although cellular networks with solar harvesting SBSs have attracted significant interest recently, especially in the areas of combining wind and solar harvesting SBSs [6], dealing