



Invited Speaker WEBINAR

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IEEE PES & ES SINGAPORE CHAPTER + SPECS

Large Scale Aggregation of Prosumers in Energy Communities



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“Large Scale Aggregation of Prosumers in Energy Communities”

Abstract: A novel scalable and privacy-preserving distributed parallel optimization that allows the participation of large-scale aggregation of prosumers with residential PV-battery systems in the market for the ancillary service (ASM) is proposed in this paper. To consider both reserve capacity and reserve energy, day-ahead and real-time stages in the ASM are considered. A method, based on hybrid Variable Neighbourhood Search (VNS) and distributed parallel optimization is designed for the day ahead and real-time optimization. Different distributed optimization methods are compared and designed, and a new distributed optimization method based on Linear Programming (LP) is designed that overcomes previous methods based on integer and Quadratic programming (QP). The proposed LP-based optimization can be easily coded up and implemented on microcontrollers and connected to a designed Internet of Things (IoT) based architecture. Both day-ahead and real-time proposed optimization methods, by allocating the computational effort among local resources, are highly scalable and fulfil the privacy of prosumers.

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Short Bio: Pierluigi Siano (M'09–SM'14) received the M.Sc. degree in electronic engineering and the Ph.D. degree in information and electrical engineering from the University of Salerno, Salerno, Italy, in 2001 and 2006, respectively. He is a Professor and Scientific Director of the Smart Grids and Smart Cities Laboratory with the Department of Management & Innovation Systems, University of Salerno. His research activities are centered on demand response, on energy management, on the integration of distributed energy resources in smart grids, on electricity markets and on planning and management of power systems. In these research fields he has co-authored more than 550 articles including more than 300 international journal papers that received in Scopus more than 11000 citations with an H-index equal to 51. In 2019 and 2020 he received the award as Highly cited Researcher by ISI Web of Science Group. He has been the Chair of the IES TC on Smart Grids. He is Editor for the Power & Energy Society Section of IEEE Access, IEEE TRANSACTIONS ON POWER SYSTEMS, IEEE TRANSACTIONS ON INDUSTRIAL INFORMATICS, IEEE TRANSACTIONS ON INDUSTRIAL ELECTRONICS, IEEE Systems, Open Journal of the IEEE IES, IET Smart Grid and IET Renewable Power Generation.



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