

## Multi-agent based modeling for electric vehicle integration in a distribution network operation - DTU Orbit (09/11/2017)

### Multi-agent based modeling for electric vehicle integration in a distribution network operation

The purpose of this paper is to present a multi-agent based modeling technology for simulating and operating a hierarchical energy management of a power distribution system with focus on EVs integration. The proposed multi-agent system consists of four types of agents: i) Distribution system operator (DSO) technical agent and ii) DSO market agents that both belong to the top layer of the hierarchy and their roles are to manage the distribution network by avoiding grid congestions and using congestion prices to coordinate the energy scheduled; iii) Electric vehicle virtual power plant agents are in the middle level of the hierarchy and their roles are to manage the charge process of the electric vehicles; iv) Electric vehicle agents are placed at the bottom layer of the hierarchy and they represent electric vehicle owners with different users' profiles. To demonstrate the coordination behavior of the proposed system, a multi-agent simulation platform is developed based on the co-simulation environment of JACK, Matlab and GAMS. The aim of the multi-agent system is to simulate the collaborative (all agents contribute to achieve an optimized global performance) but also competitive environment (each agent will try to increase its utilities or reduce its costs). [All rights reserved Elsevier].

### General information

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