



SPECIAL SESSION

ELECTRIC VEHICLES MANAGEMENT AND INTEGRATION IN SMART GRIDS AND MICROGRIDS

ORGANIZED AND CO-CHAIRIED BY:

S. Bracco - University of Genoa – DITEN

(Electrical, Electronics and Telecommunication Engineering and Naval Architecture Department), Genoa, Italy (1)

G. Ferro - University of Genoa – DIBRIS

(Department of Informatics, Bioengineering, Robotics and Systems Engineering), Genoa, Italy (2)

M. Longo - Politecnico di Milano (Department of Energy), Milan, Italy (3)

M. Robba - University of Genoa – DIBRIS

(Department of Informatics, Bioengineering, Robotics and Systems Engineering), Genoa, Italy (4)

CONTACT EMAIL:

(1) stefano.bracco@unige.it

(2) giulio.ferro@edu.unige.it

(3) michela.longo@polimi.it

(4) michela.robba@unige.it

OBJECTIVE AND TOPICS

Sustainable energy sources with low GreenHouse gas emissions (GHG) can help to reconcile the huge energy demand with an acceptable climatic impact. According to this strategy, a large part of the improvement would come from the implementation of intelligent technologies and tools for control and management of energy networks in order to enhance system efficiency and integrate renewable and clean resources. A significant contribution to greenhouse gas emissions is represented by transport and logistics. According to forecasts by the European Commission, about 25% of CO₂ (carbon dioxide) worldwide emissions are attributable to transport sector. EU and other world organizations are encouraging national authorities to arrange more and more electric or hybrid vehicles. Mass deployment of Electric Vehicles (EVs) may be a good solution, but, unfortunately, a widely usage of EVs may cause technical problems: for example, power grid can be harmfully affected by uncontrolled charging and long charging times. Besides, the aggregated charging load needs to be controlled carefully in order to avoid interruption when several thousand EVs are connected to the power system over a short period of time in parking areas/Charging Stations (CSs). EVs can represent not only a load that can be modulated but also a resource. In a not so futuristic vision, they can act as distributed energy resources, since they can provide regulation services and power supply (and thus enabling the V2G (Vehicle-to-Grid) operation). In this way, they would also absorb excess production of electricity, e.g. from renewable sources, and return it to the public grid in periods of peak loads. The first step of V2G regards Smart-Charging (SC) strategies: batteries are charged during the off-peak times achieving different advantages (the most obvious one is that they do not contribute to raise the demand peak). SC systems manage EVs charging requirement considering EVs, CSs and power grid together. Indeed, the management and integration of EVs takes to new challenges for control and optimization of CSs, EVs' optimal routes, EVs' integration in microgrids and smart grids.

The aim of the special session is to bring together international experts to discuss new challenges that can be addressed through simulation and optimization.

The main topics are (but not limited to):

- ❖ Optimal management of microgrids that include charging stations;
- ❖ Power management;
- ❖ Vehicle to grid;
- ❖ Smart charging;
- ❖ Charging tariffs;
- ❖ Electric vehicle routing;
- ❖ Electric shortest path;
- ❖ Planning and designing charging stations at Municipal and Regional Scale;
- ❖ Optimal charging of EVs;
- ❖ Integration of EVs in smart grids;
- ❖ Energy Markets;
- ❖ Optimization;
- ❖ Optimal Control;
- ❖ Model Predictive Control;
- ❖ Simulation tools.

All the instructions for paper submission are included in the conference website: <https://www.eeeic.net/eeeic>