



MED 2021

# 29<sup>th</sup> Mediterranean Conference on Control and Automation

JUNE 22 – 25 2021, BARI, ITALY, <http://med2021.poliba.it>

## Workshop Session at MED 2021

on

### **Modelling, control and optimization of flexible devices for a sustainable and efficient future power grid**

#### **Abstract**

Considering the environmental pressure and the plans by governments worldwide to reduce emissions, an increasing penetration of distributed energy resources (DERs) is expected over the coming decades. The increasing deployment of DERs, as well as of utility-level renewable energy sources in transmission networks, and the consequent decreasing use of synchronous generators, can result in significant environmental and economic benefits but, at the same time, in reduced total system inertia and controllability, hence in new challenges to the operation, optimization and control of power grids. To mitigate these issues, new technical solutions are explored by researchers and system operators worldwide. Flexible devices, such as storage systems and controllable loads, connected mainly at distribution level, are believed to have a huge potential to provide support to the grid and facilitate the integration of renewable energy sources and enhance the power system stability. However, there is still a very limited understanding of the true impacts of distributed flexible devices on the power system and of how to devise effective schemes for integrating, optimizing and controlling these devices so as to maximize the benefit they can provide to the power network. Filling this knowledge gap is essential for the transition to a more intelligent power grid. In this workshop, innovative modelling, optimization and control approaches for facilitating the integration of flexible devices into the power grid and maximize their benefits will be discussed, with special emphasis to the outcomes of a relevant ongoing EU project, CROSSBOW, *CROSS BOrder management of variable renewable energies and storage units enabling a transnational Wholesale market* (<http://crossbowproject.eu/>). This project involves 23 partners, 8 transmission system operators, and aims to propose the shared use of resources at regional/transnational level to foster cross-border management of variable renewable energies and storage units, enabling a higher penetration of clean energies whilst reducing network costs.

**Duration** Half-day

**Preferred mode of presentation (to be confirmed closer to the conference and depending on the pandemics evolution):** Hybrid

#### **Organizers**

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## Session 1: Distributed Energy Resources – challenges and opportunities

### Speakers:

- Professor Federico Milano, University College Dublin (UCD), Ireland  
*“Coupling of frequency and voltage control of Distributed Energy Resources (DERs) and controllable loads”*
- Professor Tim Green, Imperial College London, United Kingdom  
*“The challenge of preparing grids for very high penetration of inverter-based resources”*
- Professor Maria Prandini, Politecnico di Milano, Italy  
*“Multi-agent cooperative optimization with application to energy systems”*
- Professor Frede Blaabjerg, Aalborg University, Denmark  
*“Power Electronics – the enabling technology for modern distribution system”*

## Session 2: CROSSBOW – pathways to relaxing regional cross-border power exchanges

### Speakers:

- Dr. Alessandra Parisio, University of Manchester, United Kingdom  
*“Distribution control of Virtual Storage Plants for improved power network support”*
- Professor Igor Kuzle, University of Zagreb, Croatia  
*“Virtual storage plants test bed”*
- Dr. Dimitrios Papadaskalopoulos, Imperial College London, United Kingdom  
*“Distributed optimization and reinforcement learning approaches for coordinating demand flexibility in emerging electricity markets”*
- Lucas Pons Bayarri, ETRA Investigación y Desarrollo S.A., Spain  
*“CROSSBOW project components integration and deployment towards realization of real demonstrations in the region”*
- Marijana Marić, SCC- Security Coordination Centre Ltd. Belgrade, Serbia  
*“Dynamic Line Rating forecast for overhead line”*