

## **Demand Response and Smart Grids**

Pierluigi Siano, Eng., Ph.D.

Associate Professor of Electrical Energy Engineering  
Department of Industrial Engineering, University of Salerno

The smart grid is conceived as an electric grid able to deliver electricity in a controlled, smart way from points of generation to active consumers. Demand response (DR), by promoting the interaction and responsiveness of the customers, may offer a broad range of potential benefits on system operation and expansion and on market efficiency. Moreover, by improving the reliability of the power system and, in the long term, lowering peak demand, DR reduces overall plant and capital cost investments and postpones the need for network upgrades. Innovative enabling technologies and systems, such as smart meters, energy controllers, communication systems, are decisive to facilitate the coordination of efficiency and DR in a smart grid.

The keynote will highlight the challenges for DR initiatives for residential loads in smart grids and will focus on the key developments in design and implementation of Demand Response for residential loads. In particular, it will underline the need of probabilistic methodologies for evaluating the impact of DR choices considering uncertainties related to load demand, user preferences, environmental conditions, house thermal behaviour and electricity market trends.