

# I Symposium on Modelling and Simulation Challenges for Future Sustainable Energy Systems

Delft University of Technology -TU Delft, Delft Netherlands

Friday, 26<sup>th</sup> June 2015

## 1. Introduction

The use of computers for modelling and simulating power systems has a history almost as long as the history of the computer itself. It is a proud history of achievement and contributions to human knowledge and capabilities. In light of dramatic structural changes, there are, however, several major challenges for accurate representation of power systems and computational efficiency in academic and industry community, which are mainly motivated by: (1) *Size*: +100k lines ... “most complex machine ever built”, (2) *Complexity*: nonlinear, hierarchical, and discrete decisions, and (3) *Uncertainty*: demand and supply (renewable). Looking to the future, power systems modelling and simulation face additional challenges: (i) *unforeseen level of uncertainties* both generation and demand side, where human behaviour and other non-electricity related phenomenon will increase cognitive uncertainties, (ii) Needs for *nearest real-time decision processes* (markets, operation and control), (iii) colossal deployment of intelligent devices collecting *massive amount of data*, (iv) *Integration of several types of energy into a single multi-scale energy system* (gas, heating, cooling, transportation, etc.) and proliferation of power electronic interfaced generators and loads. These driving forces are creating serious doubts about the suitability and limitations of traditional techniques for modelling and simulations for future energy systems. This symposium brings together scholars, scientists and researchers in a collaborative environment to present and discuss issues relating to tendencies in modelling and simulation of future energy systems. It provides an overview on the recent advances, experiences, and challenges from ongoing research activities in these fields and opens the debate to new ideas to improve modelling and simulation techniques.

## 2. Objective

Share knowledge and vision of forthcoming modelling and simulation techniques for future energy systems.

## 2. Duration

**Tutorial:** 09:30-12:30

**Symposium:** 14:00-19:10

## 4. Expected Background of Participants:

Basic understanding of power system dynamic and modelling simulation.

## 5. Expected Audience:

This workshop is addressed to scholars, researchers, PhD students, Senior MSc students as well as engineers from industry having research interests in modelling and simulation of power systems.

## 6. Programme:

- 09:30      **Tutorial on emerging metaheuristics**  
Dr Jose Luis Rueda Torres, TU Delft, Netherlands
- 11:00      **Tutorial on Modelling Renewables and Storage in PowerFactory**  
Dr F. Gonzalez-Longatt, Loughborough University, United Kingdom
- 14:00      **Symposium Chair's welcome and opening**
- 14:10      **Keynote speaker 1:**  
*"Application of Emerging Metaheuristics in Power System Field"*  
Dr Jose Luis Rueda Torres, TU Delft, Netherlands
- 14:50      **Keynote speaker 2:**  
*"A Rationalist Perspective of Power System Modeling and Simulation without Dogmas"*  
Dr Luigi Vanfreti, KTH, Sweden
- 15:30      **Keynote speaker 3:**  
*"Offshore HVDC grids: Advantages and remaining challenges"*  
Dr Dirk Van Hertem, KU Leuven, Belgium
- 16:10      **Coffee break y snacks –Networking time**
- 16:20      **Keynote speaker 4:**  
*"Modeling and Simulation of offshore wind farms"*  
Prof István Erlich, Universität Duisburg-Essen, Germany
- 17:00      **Keynote speaker 5:**

*“Some ongoing research topics in intelligent power grids”*  
Dr Marjan Popov, TU Delft, Netherlands

- 17:40      **Keynote speaker 6:**  
*“Co-simulation of Energy Systems”*  
Dr Peter Palensky, TU Delft, Netherlands
- 18:20      **Keynote speaker 7:**  
*“Efficient Dynamic Simulation in PowerFactory”*  
Davide Fabozzi, DIgSILENT GmbH, Germany
- 19:00      **Chairs' closing remarks**
- 19:05      **“PowerFactory for Power Systems Applications” Book  
Presentation and Launch**
- 19:10      **Close of conference**

## **7. Organization:**

### **Conference Chairs**

- Dr. Jose Luis Rueda Torres, Assistant Professor of Intelligent Electrical Power Grids – Delft University of Technology, The Netherlands
- Dr. Francisco Gonzalez-Longatt, Lecturer in Electrical Power Systems - Loughborough University, United Kingdom

**Local Organizing Committee:** TU Delft IEEE Branch

### **General Secretary:**

- Swasti Khuntia ([S.R.Khuntia@tudelft.nl](mailto:S.R.Khuntia@tudelft.nl))

## **8. Sponsors:**

- IEEE Benelux Section
- Student Branch, IEEE TU-Delft

## **9. Registration.**

- Please register via email to [S.R.Khuntia@tudelft.nl](mailto:S.R.Khuntia@tudelft.nl)
- Maximum number of participants is 80.
- Places are available on a first come first served basis.