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# LECTURE SERIES

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**PRESENTED BY THE WATERLOO INSTITUTE FOR SUSTAINABLE ENERGY**

**Friday, August 9, 2013**
**9:30 – 10:30 am**
**EIT 3142**

# UNDERSTANDING ACTIVE NETWORK MANAGEMENT IN 40 MINUTES

**RECEPTION AND REFRESHMENTS FOLLOW THE LECTURE**

**Prof. Damien Ernst**, Associate Professor, University of Liège

In Europe, concern about environmental impact of the electricity industry is currently driving the growth of renewable electricity generation through a class of financial support mechanisms. Such incentives have resulted in the ongoing installation of wind and solar generation resources at the distribution level of the electricity network. This development calls for the evolution of distribution network planning and operational strategies to accommodate the energy inflow from such DG resources. The dominant doctrine for the distribution network planning and operation has been the fit and forget approach. Under this approach, enough investments in network components (lines, cables, transformers, etc.) must be made in order to avoid congestion and voltage problems. To that end, network planning is made with respect to a set of critical scenarios consisting of DG production/demand levels. In this manner, sufficient operational margins are ensured. Nevertheless, with rapid growth of DG resources, the preservation of such conservative margins comes at continuously increasing network reinforcement costs.

To avoid prohibitively high network reinforcement costs, active network management (ANM) strategies are proposed as alternatives to the fit and forget approach. The principle of ANM is to address congestion and voltage issues via short-term decision making policies, developed on the basis of the optimal power flow (OPF) problem formulation.

This talk will discuss active management solutions through examples:

- How to state mathematically active network management problems.
- Computational and technical challenges for implementing solutions to these problems.
- Models of interaction between the different actors of the electrical industry that need to be implemented to accommodate the ANM proposed solutions.

**Biography**

Prof. Damien Ernst is an Associate Professor at the University of Liège, Montefiore Institute. He is also the holder of the EDF-Luminus chair of Smart Grids.

Prof. Ernst has been a Research Fellow of the National Fund of Scientific Research and prior to that an Assistant Professor at SUPELEC, a top French “Grande Ecole” for engineers.

Professor Ernst is an expert in power system dynamics and control as well as in reinforcement learning. He has co-authored more than 150 research papers and two books in these fields. He has received numerous awards for his work.

**10:30 am**

**RECEPTION AND REFRESHMENTS**

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