CITIES
Centre for IT Intelligent Energy Systems

CITIES seminar and PhD defense Ignacio Blanco

Date: **Friday, 22. February 2019**
Place: **DTU Lyngby, Campus, Building 101, Room S10**
Contact: **Daniela Guericke, dngk@dtu.dk**

CITIES Seminar:

In the morning, the PhD committee members will give talks about their research and work related to integrated energy systems.

Please register for this seminar by sending an email to dngk@dtu.dk before Wednesday, 20th February 2019.

Agenda:

10:00 - 10:05	Welcome by Henrik Madsen
10:05 - 10:35	Talk by Nina Detlefsen, Grøn Energi *Utilize excess heat from data centers in district heating - opportunities and challenges*
10:35 - 10:50	Coffee break
10:50 - 11:20	Talk by Russell McKenna, DTU Management Engineering *Some approaches to modelling low-carbon decentralized energy systems*
11:20 - 11:50	Talk by Hrvoje Pandžić, University of Zagreb, Faculty of Electrical Engineering and Computing *Policies and Models for Integration of Energy Storage*

PhD Defense - Ignacio Blanco:

Title of the PhD thesis: Decision-making Under Uncertainty for the Operation of Integrated Energy Systems

Agenda:

13:00 - 14:00	PhD thesis presentation by Ignacio Blanco
14:00 - 16:00	PhD defense
16:00 - 17:30	Reception in Building 303B, Lunch room upstairs

Summary of the PhD thesis:

The integration of renewable and partly unpredictable energy sources has increased the need for flexibility in the power systems. One of the possibilities to provide this flexibility is by integrating different energy systems such as heat and power. The motivation of this thesis is to provide solutions that facilitate the operation of integrated energy systems under uncertain conditions.

This thesis deals with the development and application of solution approaches in the form of optimization problems for energy operators and companies that operate under uncertain conditions in an integrated energy system setting. First, we develop new solution approaches that are capable of handling large-scale optimization problems with a significant amount of uncertain data providing suitable solutions for the decision-maker while drastically reducing the solution time of the problem.
Second, we propose decision support solutions for district heating producers to optimize their production and create bids for the day-ahead and balancing electricity markets. Finally, we explore new ways of reducing the impact of uncertainty in fuel supply planning and evaluate new biomass contract designs for large combined heat and power producers using decision-making under uncertainty.

All the solution approaches presented in this thesis are used for extensive analyses of the realistic systems used as case studies. These analyses evaluate e.g., how uncertainty affects the obtained solution in terms of operating costs and how the studied systems can react to the uncertainty.