Morning seminar (9:00 – 10:30) Building Simulation and Energy Flexible Buildings in a smart cities context
Meeting Room S09, Building 101, DTU Kgs. Lyngby

9:00 Welcome by Henrik Madsen / Carsten Rode
9:05 *The role of simulation in relation to the development of sustainable and smart cities* by Professor Jan Hensen, TU Eindhoven
9:35 Discussion
9:45 *Overview of work in IEA EBC Annex 67 – Energy Flexible Buildings* by Operating Agent, Senior Project Manager Søren Østergaard Jensen, Danish Technological Institute
10:15 Discussion
10:25 – 10.30 Final words

10:30 - 12:30 Participants can go to Meeting Room S10 to work/meet on their own before Panagiota's defense.
(Lunch on your own, e.g. in one of DTU's canteens).

13:00 – 16:00 Panagiota Gianniou's PhD defense.
Meeting Room 1, Building 101, DTU Kgs. Lyngby

13:00 – 13:45 Panagiota Gianniou's lecture ***Energy demand models for buildings in a smart cities context***.
13:45 – 16:00 (no later) Panagiota Gianniou's discussion with members of the Assessment Committee and her supervisors about the research work. Members of the audience can ask questions if reported to the chairman of the defence act.

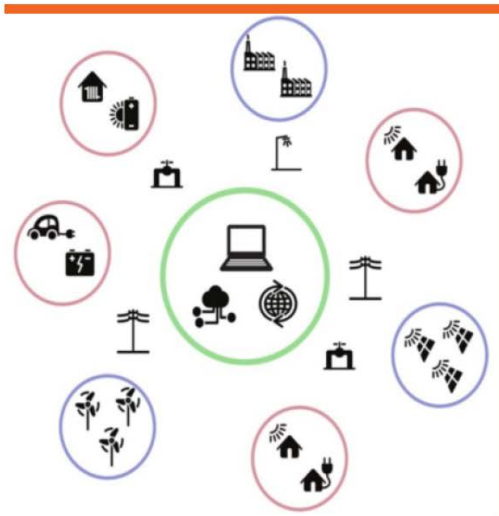
Assessment Committee:
- Professor Jan Hensen, TU Eindhoven
- Senior Project Manager Søren Østergaard Jensen, Danish Technological Institute
- Associate Professor Jakub Kolarik, DTU Civil Engineering

Supervisors have been
- Professor Carsten Rode, DTU Civil Engineering
- Associate Professor, Alfred Heller DTU Civil Engineering and NIRAS A/S
- Senior Researcher Per Sieverts Nielsen, DTU Management Engineering

Chairman of defense procedure will be Associate Professor Pawel Wargocki, DTU Civil Engineering

After the defense: Everyone is invited for a reception, where also the conclusion of the Assessment Committee's Final Recommendation will be announced after their deliberation.

Energy demand models for buildings in a smart cities context



Panagiota Gianniou

PhD Thesis

Department of Civil Engineering
2018

DTU Civil Engineering Report R-390

Thesis Abstract

Energy is one of the major drivers in smart cities along with smart environment and smart living. The role that buildings can play in the development and operation of smart energy cities is important, due to the large share of energy use they are responsible for and the smart energy solutions they can potentially integrate. The increasing number of smart cities initiatives and their focus on city level energy policy management has emphasized the need to move from the traditional micro-level building energy modelling towards the development of aggregated energy demand models. To accomplish that, methods that can be scalable to higher levels of aggregation, ranging from clusters of buildings to neighborhoods and cities are needed.

The present thesis aims at providing enhanced modelling methodologies that provide building energy demand related insights in a high spatial and temporal resolution, which can help to evaluate energy policies and demand side management strategies. The main objectives of the thesis are:

- to propose and investigate engineering-based approaches, statistical methods and data mining techniques that can contribute to the accurate building energy demand modelling at urban scale;
- to determine the potential that buildings can have on the stabilization of the energy grid and the flexible operation of the energy system - considering a smart energy cities context - both at building level and urban level;
- and finally, to indicate the suitability of each category of proposed modelling methodologies and provide guidelines for future investigations.