

**Project period:**

February 1, 2015 – January 31, 2018

**Budget:**

DKK 8,762,889

**Funding:**

EUDP

**Project Manager:**

Thomas Busk Espersen, Insero Software

**Research partners:**

Center for Energy Informatics, SDU

**Other partners:**

Green Tech Center (GTC)

TREFOR EI-net A/S

Insero Business Services A/S

**Collaboration partners:**

Lawrence Berkeley National Laboratories (LBNL)

## Demand-Response Capacity Management in Commercial Buildings

In March 22, 2012, the Danish parliament succeeded in obtaining broad political commitment to an ambitious green transition that focuses on promoting renewable energy (RE) in all sectors of society. The Energy Agreement requires substantial expansion of RE. However, this transition implies that energy production, in terms of wind turbines and photovoltaic, will be distributed throughout the electricity grid, thereby creating new challenges for the total system balance and for the distribution system operators (DSO) on contingency and compliance with the +/- 10% voltage limits. This transition in production will also require new players to ensure the delivery of ancillary services, load for the intraday market and for balancing power.

The project's objective is to demonstrate how smart grid technology will enable operators of commercial buildings to provide flexibility services to existing flexibility markets and to DSOs as a set of DSO specific demand-response services defined in the iPower project. The demand-response services are implemented using direct control methodologies applying the OpenADR standard from Lawrence Berkeley National Laboratories (LBNL) and demonstrated using the main office building, a newly established office building of 4000 m<sup>2</sup>, at the Green Tech Center in Vejle and the 15 years old Mærsk McKinney Møller Building of 3000 m<sup>2</sup>, at the Southern Danish University.

The demonstration includes both technical investigations of the building's demand-response capacity with respect to ventilation and cooling, and participatory user studies of how tenants experience the impact of demand-response events on building comfort. The aim of the user studies is to gain new insights, to increase the usability and acceptance of the demonstrated demand-response services.

The results from the technical investigations and participatory user studies are used together with grid data from the Danish DSO TREFOR to evaluate the value that the demonstrated demand-response services can provide to DSO. A pre-project study for the selected buildings has shown a viable business case for the commercial building owner and the Aggregator in the selected flexibility markets. The results from this project will be used to evaluate the business.

