



## Intelligent Demand Response Framework for Cooperative Customer Side Load Management

With fluctuating energy sources such as windmills and solar plants forming the base of the energy supply, the supply situation on the energy grid is constantly changing. Whereas the output of traditional power plants fueled by coal, gas, and oil are easily controlled, this is not the case for the renewable energy sources. As a result a sudden increase in supply demand cannot be met by increasing the output from the energy sources. This means that a stable energy supply cannot be ensured through traditional measures.

As the energy production cannot adapt to the energy consumption, energy consumption must adapt to the energy supply situation. This calls for flexible consumers, which are able to regulate their energy consumption based on the current situation on the energy grid. From a consumer perspective intelligent control systems are needed, which can respond to demands from the energy grid. The producer on the other hand needs a tool, helping to maintain a balance on the power grid between energy production and consumption by adjusting demands to the consumers.

This project will focus on the creation of a general purpose framework for intelligent control of electricity consumption in smart buildings, in which electric installations are controlled by computerized units. Controleum, an existing framework to control the energy consumption of greenhouses, will be enhanced to support the control of electricity consumption in any smart building. Further research will be conducted to define an informational description of an intelligent consumer, to enable producers to utilize this information in balancing supply and demand on the energy grid.

**Project period:**

September 1, 2012 – August 31, 2015

**Funding:**

Danish Lighting Innovation Network

**Ph.D. student:**

Anders Clausen

**Supervisor/University:**

Associate Professor, Ph.D. Bo Nørregaard Jørgensen, The Maersk McKinney Moller Institute

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