



## Smart Grid Ready Energy Efficient Lighting System for Green House Horticulture

With the Energy Agreement of March 22, 2012 Denmark has succeeded in obtaining broad political commitment to an ambitious green transition, that focuses on promoting renewable energy in all sectors. The agreement requires substantial expansion of wind power corresponding to the annual consumption of 1.5 million households. Thus in 2020 wind power will account for approximately 50% of the electricity consumption compared to 25% today.

Moving towards intermittent energy sources such as wind power will challenge the electricity grid, as it implies supply-driven consumption in contrast to the consumer-driven production, that we have today. The Energy Agreement focuses on Smart Grid technology as a means to face this challenge.

However for Smart Grid to succeed, we need intelligent consumers, so-called prosumers, which automatically adjust their electricity consumption to the actual supply situation. Accounting for approximately 1% (280 GWh) of the national electricity usage commercial greenhouses are interesting as prosumers, as the majority of their electricity consumption is isolated to a single production process: supplementary lighting for controlling crop growth.

This project will enable commercial greenhouses to become Smart-Grid Ready by developing the next generation of energy-cost-efficient-supplemental-lighting systems, that utilize the physiological flexibility of crops to provide balancing services in the Danish Smart Grid anno 2020. The envisioned solution provides innovative use of weather forecasts, combinations of SON-T and LED lamps, light response profiles showing the ability of different crops to adapt to irregular light conditions, together with Smart Grid price signals to achieve this goal. The developed software will be integrated with the Smart Grid through the DONG Energy Power Hub project.

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### Budget:

DKK 20.617.718

### Funding:

EUDP and GUDP

### Project Manager:

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### Industrial partners:

Dong Energy  
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Philips  
Green Tech Solutions ApS  
ConWx ApS  
Gartneriet Knud Jepsen A/S  
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