

## Hubgrade - Energy Saving Centre

### A Low Energy Districts Solution

#### SMART SOLUTION 3: SMART ENERGY-SAVING TENANTS



- 24/7 remote control of building
- Provides continuous scrutiny of selected installation and/or energy saving activities
- Tracks trends in energy to allow users to proactively optimise energy consumption
- Provides alarms on sudden temperature fall or undesired increase in energy consumption



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## What is the solution?

Hubgrade combines a number of energy-saving measures working in combination. These are described in this factsheet.

The Hubgrade software complements the work started by the Energy Coordinator. It is available to all property owners and focuses on reducing energy cost.

The combination of Technical Facility Management with Energy Management gives the property owner the possibility to secure the buildings' energy performance.

We consider energy saving to be an ongoing process involving the right technique, the right maintenance but also the right behaviour.

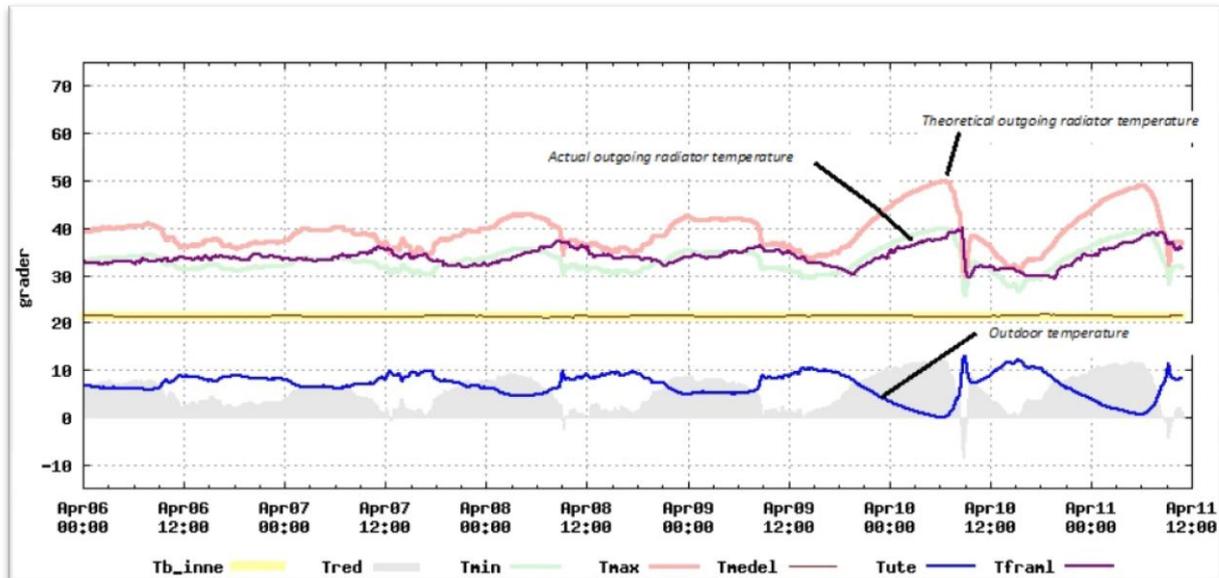
## How does it work?

The building's new or existing control systems are connected to the Hubgrade software. Additional measurement techniques, such as indoor temperature sensors, are installed. Data is collected from the District Heating Network, water sensors and electrical sensors through automatic meter readings, allowing users to read the "live" data and respond proactively.

Analysis and comparison is also made in order to regulate consumption at the desired level. If necessary, the parameters can be adjusted remotely from the Operations Centre.

In order to optimise the building's energy usage, several different solutions are being installed. These are described in the following pages.

## Adaptive Temperature control system



### What is the solution?

An adaptive control system that influences but does not replace the existing controlling system.

A normal controlling system uses outdoor temperature to adjust the outgoing water temperature to the heating system. This system constantly monitors the indoor temperature to influence the existing controlling system for heating.

In this way the building's own "inertia" can be used in view of including solar radiation, various activities in the property etc.

"Inertia" is in this case best described as using a building's basic construction, possible insulation and activities inside, to keep indoor temperature at wished level without unnecessary raise of water temperature.

The system can thereby avoid unnecessary increases in water temperature due to sudden changes of outdoor temperatures. This often occurs during the autumn and spring, with warm days and cooler nights.

### How does it work?

The system is constantly measuring indoor temperature in selected apartments/rooms to get an exact reference temperature which can be used by the adaptive control system. Existing regulation systems are not replaced but rather influenced by the adaptive control system. The system continuously provides the most efficient outgoing temperature to the heating system.

### Expected impact

This solution has a positive impact for the city in terms of the key GrowSmarter objectives:

- Increases energy saving potential from 5% to 15%
- Reduces environmental impact
- Promotes sustainable economic development

## Potential for replication

This system is easy to install on almost all types of existing control systems using outdoor temperature as reference input. It's an easy roll out technique for a larger market. The system is managed and controlled through a cloud making it easy to follow the energy saving results.

This solution has great potential for replication as it is easily installed in almost all types of buildings and can be used with almost every type of control system on the market.



## Water saving Equipment

- Easy to install on standard taps
- Guaranteed flow regardless of building high or pressure in net
- Up to 60% water savings on individual taps
- Target to save 20-30% of overall water consumption

## Adaptive Current Equalisation

### What is the solution?

EnergyHub is an electrical Hub controlling photovoltaic solar harvest, energy storage and electrical consumption analysis in one system. The EnergyHub consists of modular, distributed power electronics managing energy flow between PV production, energy storage and local consumption/grid export.

The smart meter and automatic energy analysis ensure optimal usage of the harvested PV energy with energy storage and self-learning algorithms. The hub is both modular and scalable, thanks to the DC nanogrid technology which allows for functionality and capacity to be increased over time with one single system control.

#### ACE

An important part of the EnergyHub system is the patented ACE (Adaptive Current Equalisation) function - which allows for a more efficient use of the three phase supply.

The EnergyHub transfers energy between the phase conductors when too many loads are connected to one phase conductor. This increases the headroom between the main fuse rating and the load, allowing for better dimensioning of cables and infrastructure and removing unwanted current in the neutral conductor.

The headroom can either be used to reduce the main fuse rating or allow for more efficient and faster electric vehicle charging without costly upgrades to the electrical system.

### How does it work?

The EnergyHub ACE function measures the electrical consumption of a building and transfers energy between phases as necessary in order to protect mains fuses and/or improve power quality.

The collected data is analysed by the EnergyHub cloud platform, which combines the building's load profile with electricity prices and the weather forecast to create a basis for efficient system control.

Automatic decisions are made to prepare energy storage for optimal use of electricity tariffs and solar production. As an example, batteries can be charged from the grid at night at lower cost if low PV production is expected in order to manage power capacity peaks.

This allows the EnergyHub system to be used for peak shifting/shaving and load control in order to reduce costly power capacity peaks. The EnergyHub system operates as a PV system during day time, storing excess PV in energy storage for use during the night and winter months.

The EnergyHub can therefore be used 24 hours a day, 365 days a year for optimal usage of a building's solar energy supply.

## Expected impact

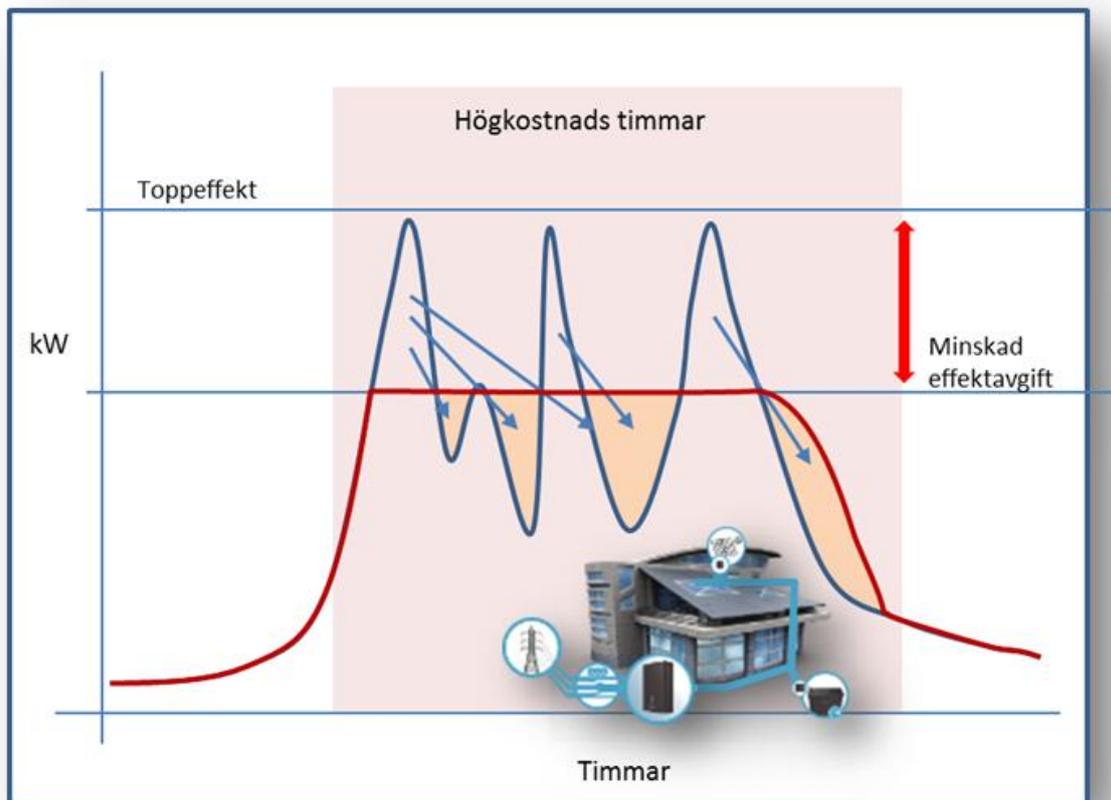
This solution has a positive impact to the city in terms of the key GrowSmarter objectives:

- Energy saving potential is increased from 5% to 35%
- Enables better usage of PV solar investment
- Reduces stress on a building's electrical system with increased EV charging
- Reduces stress on electrical distribution systems through local production – storage – load control
- Prepared for new business models and smart grid support functions
- Reduces negative environmental impact

## Potential for replication

This system has a high potential for roll-out in the broader market, as it can be installed on almost any three phase system and creates a more stable building and distribution grid, optimised energy use, sustainable energy integration and electrical system maintenance and control.

The control provided through Hubgrade© gives the opportunity to stabilise electricity usage in the long term.



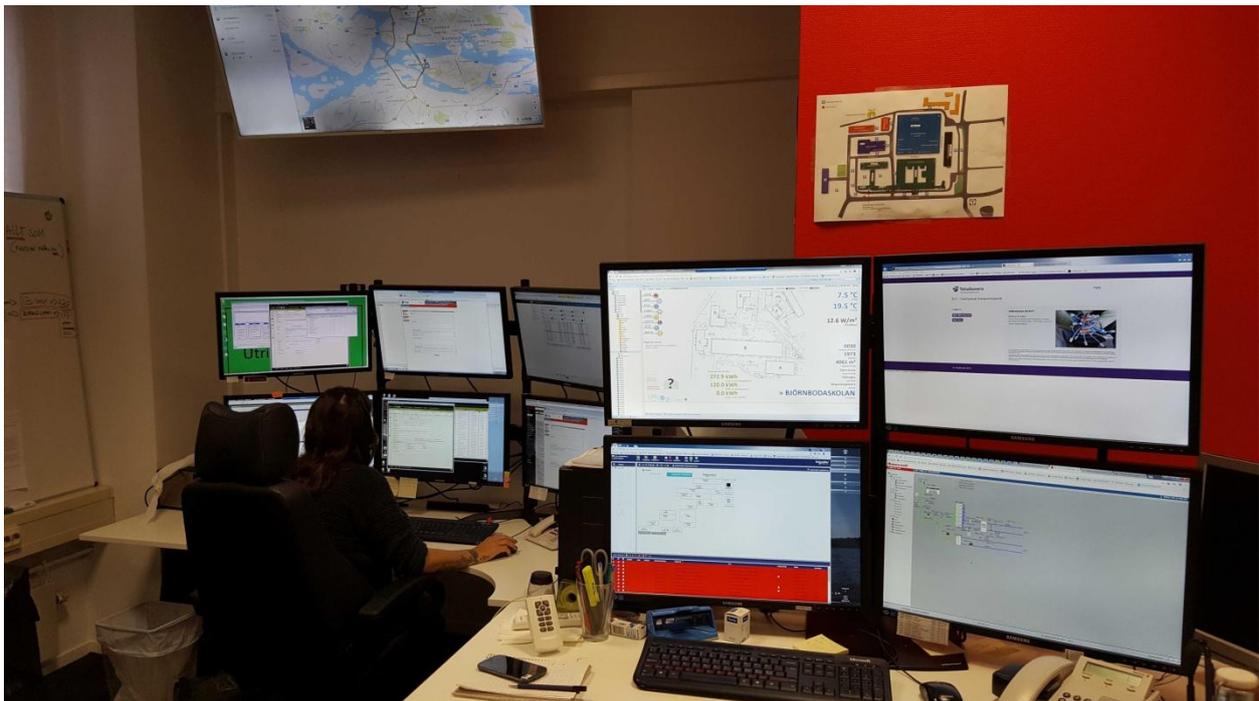
## Expected Impact of Hubgrade ©

This solution has a positive impact to the city in terms of the key GrowSmarter objectives:

- Enables monitoring and verification of completed energy saving activities
- Improves quality of life
- Optimises energy used
- Reduces environmental impact
- Promotes sustainable economic development

## Potential for replication

A lot of buildings can be affected positively by a 24/7 supervision, that allows for the monitoring and identification of unwanted rises in energy use or sudden temperature falls. With Hubgrade the methods and processes are automated and monitoring becomes easier.



## About GrowSmarter

GrowSmarter ([www.grow-smarter.eu](http://www.grow-smarter.eu)) brings together cities and industry to integrate, demonstrate and stimulate the uptake of '12 smart city solutions' in energy, infrastructure and transport, to provide other European cities with insights and create a ready market to support the transition to a smart, sustainable Europe.

## GrowSmarter project partners



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