



Smart Building Performance Assessment, integrated real time monitoring and building simulation

Division of Building Service and Energy Systems (BSES)
School of Architecture and the Built Environment
KTH – Royal Institute of Technology

IBPSA Nordic Seminar in Lund the 20 September 2013
Organized by
The Nordic regional affiliate of IBPSA
(the International Building Performance Simulation Association)



Demand-/challenge

- Indoor environment and energy high-performing buildings
- Integrated building performance assessment and visualization
- Indoor climate and energy modelling (BIM-based building services apps)
- Behavioural aspects (interaction between human and technical systems)

Source: Division of Building Service and Energy Systems (BSES)
KTH – Royal Institute of Technology



Real-Time Integrated Building Energy Performance Assessment and Visualization (2013-2015)

New Swedbank Headquarters (45 000 m² BTA)
Landsv 40, Sundbyberg
Inauguration – April 2014



Green Fingerprint



HUMLEGÅRDEN

Researchers
Marko Granroth
Ivo Martinac

Sponsors
Humlegården Fastigheter AB
Application to SEA submitted

International Partners
CRC for Low Carbon Living, Sydney, AU

Figure 1. A sketch during the Briefing stage.

The purpose of this research project is to investigate over a period of **two years** how a new building ought to be operated and managed to result in an objectively (measured) and subjectively (perceived) - good indoor climate – with high energy- and cost-efficiency as well as a low environmental impact.

Figure to the right: Humlegården AB, 2012
Figure to the left: 2011, M. Granroth; ISBN 978-91-979768-0-0



Real-Time Integrated Building Energy Performance Assessment and Visualization (2013-2015)

One of the objectives is to assess the feasibility *how to integrate measurements of the building* (real-time monitoring) and *visualizing building performance* (building simulation).

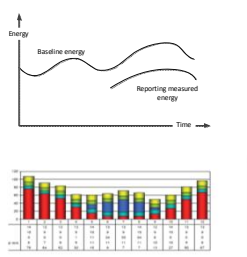
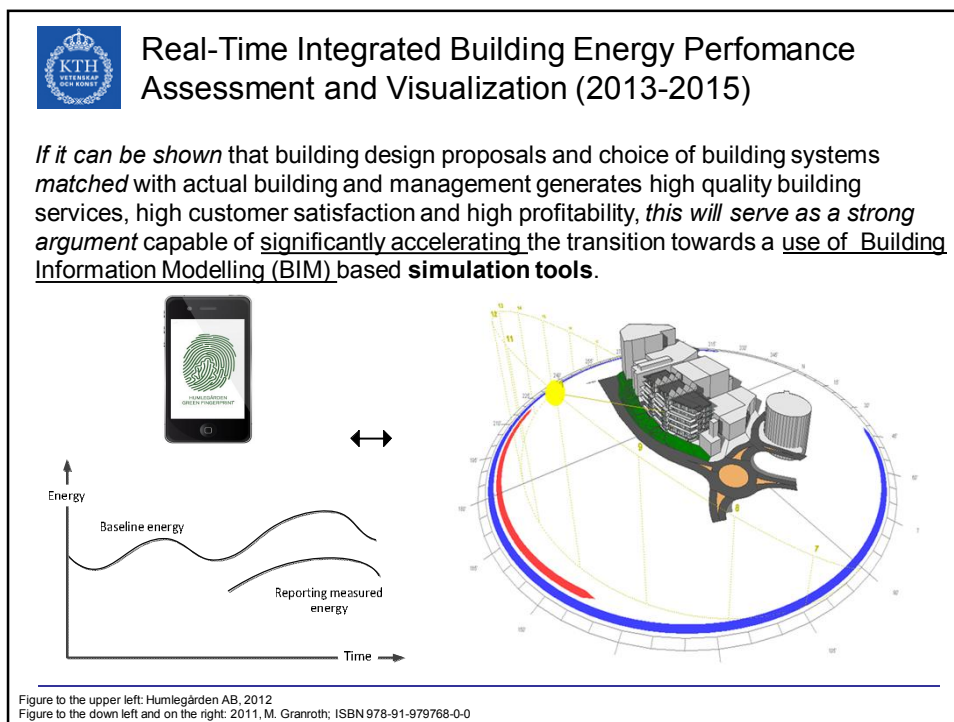
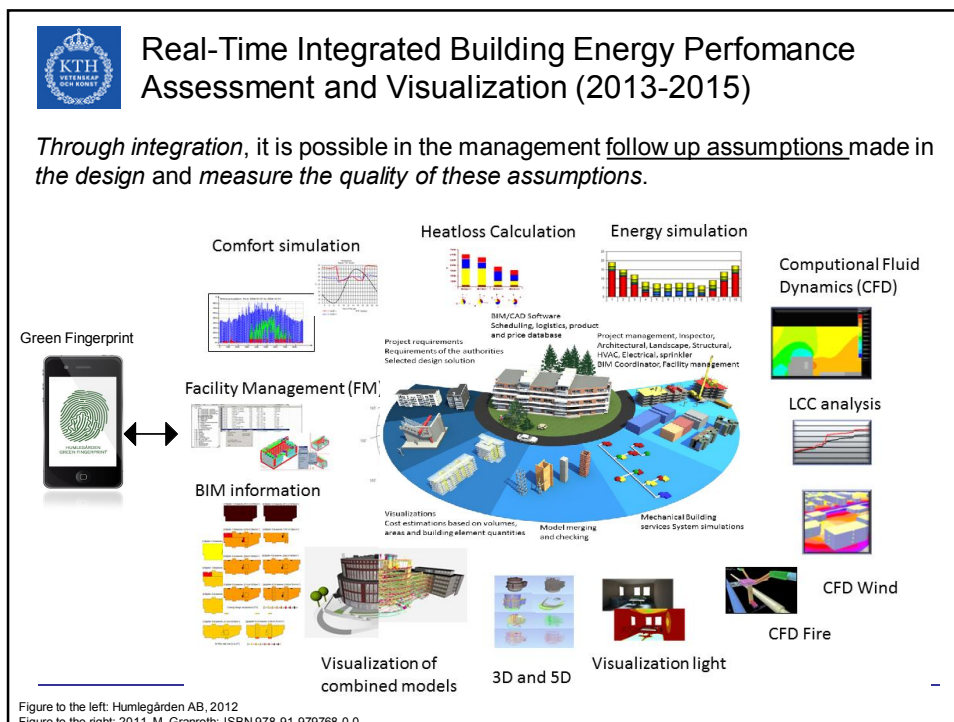


Figure 2. The sketch is developed in the end of briefing stage; the simulation shows the building's total energy requirement. Upper left: the building's assumed energy signature, as it may appear on verification of the property's energy usage. Lower left: the building's total energy requirement by month. Right figure; real-time monitoring and visualizing building performs in the management phase through the app Green Fingerprint

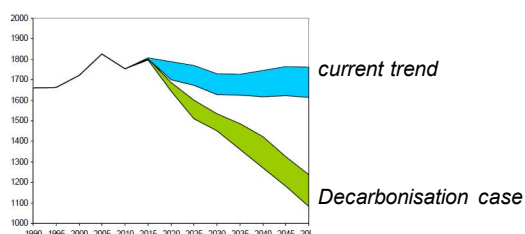
Figure in the middle and right: Humlegården AB, 2012
Figure to the left: 2011, M. Granroth; ISBN 978-91-979768-0-0





Real-Time Integrated Building Energy Performance Assessment and Visualization (2013-2015)

...as well as a sustainable built environment that compliance with national and European environmental goals (2020/2050).



Europe 2020 initiative

A strategy for **competitive, sustainable and secure energy**¹

Energy Roadmap 2050

Moving to a reasonable low-carbon economy in 2050, while at the same time ensuring security of energy supply and competitiveness²

¹) Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings

²) Energy Roadmap 2050, EUROPEAN COMMISSION, Brussels, 15.12.2011, COM(2011)885 final

* Figure Energy Roadmap 2050, EUROPEAN COMMISSION, Brussels, 15.12.2011, COM(2011)885 final, Gräfe 3




Real-Time Integrated Building Energy Performance Assessment and Visualization (2013-2015)

*The study is expected to produce a user-friendly tool (a significant improvement on Humlegården's existing Green Fingerprint software) for **measuring, analyzing and visualizing the overall energy performance** of office buildings, a series of **innovative performance parameters** as well as a **building-specific energy signature**.*




Figure in the left: 2011, M. Granroth; ISBN 978-91-979768-0-0
Figure in the middle and right: Humlegården AB, 2012




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Questions?

Keywords: office building, integration, real-time monitoring, Building simulation, design proposals, management, BIM, European environmental goals (2020/2050)



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Understanding, not just facts and figures.

Marko Granroth
granroth@kth.se

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