EU Research Project HESMOS

Energy Laboratory for life cycle optimisation of public private partnership projects

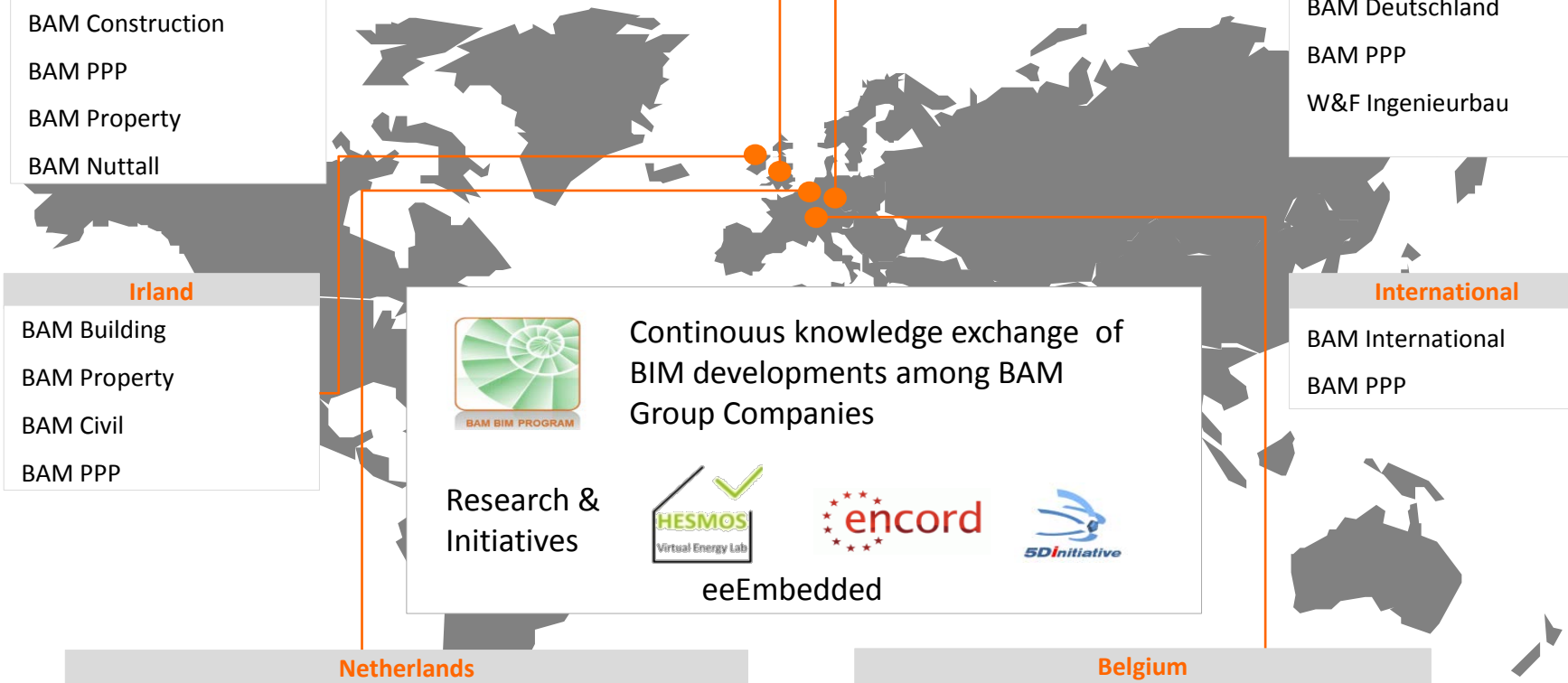
BAM Deutschland AG

Bastian Bort and Marie-Christine Geißler

AGENDA

1. **BIM Initiatives Royal BAM Group nv**
2. HESMOS Research Project
3. Integrated Virtual Energy Laboratory (IVEL)
   a. nD Navigator
   b. WebROOMEX
   c. Granlund Manager
4. Implementation on Pilot Project
5. Benefits of IVEL
   a. Process
   b. Building
6. Conclusion

BIM Initiatives Royal BAM Group



UK
- BAM Construction
- BAM PPP
- BAM Property
- BAM Nuttall

Germany & Switzerland
- BAM Deutschland
- BAM PPP
- W&F Ingenieurbau

Irland
- BAM Building
- BAM Property
- BAM Civil
- BAM PPP

International
- BAM International
- BAM PPP

BAM BIM PROGRAM

Continouus knowledge exchange of BIM developments among BAM Group Companies

Research & Initiatives

HESMOS Virtual Energy Lab

encord

5DInitiative

eeEmbedded

Netherlands

BAM Utiliteitsbouw	AM	BAM Civiel
BAM Woningbouw	IPMMC	BAM Infratechniek
BAM Heilijgers	BAM PPP	BAM Rail
BAM Techniek		BAM Wegen

Belgium

BAM Wallonie	Kairos	Betonac
Interbuild	Immo BAM	
CEI-De Meyer	BAM PPP	

bam Deutschland

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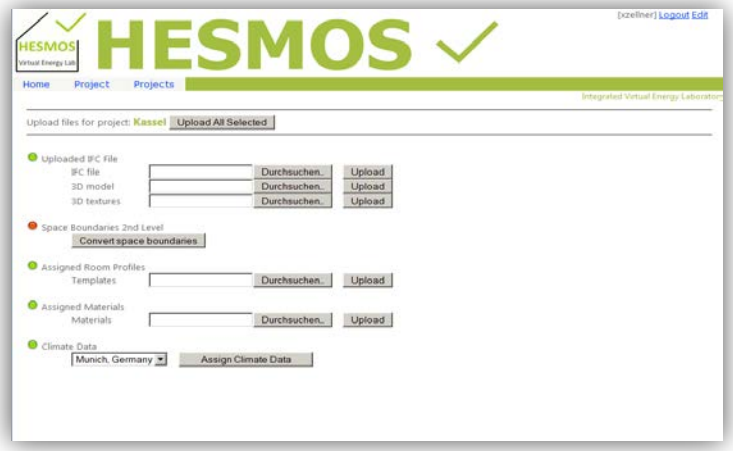
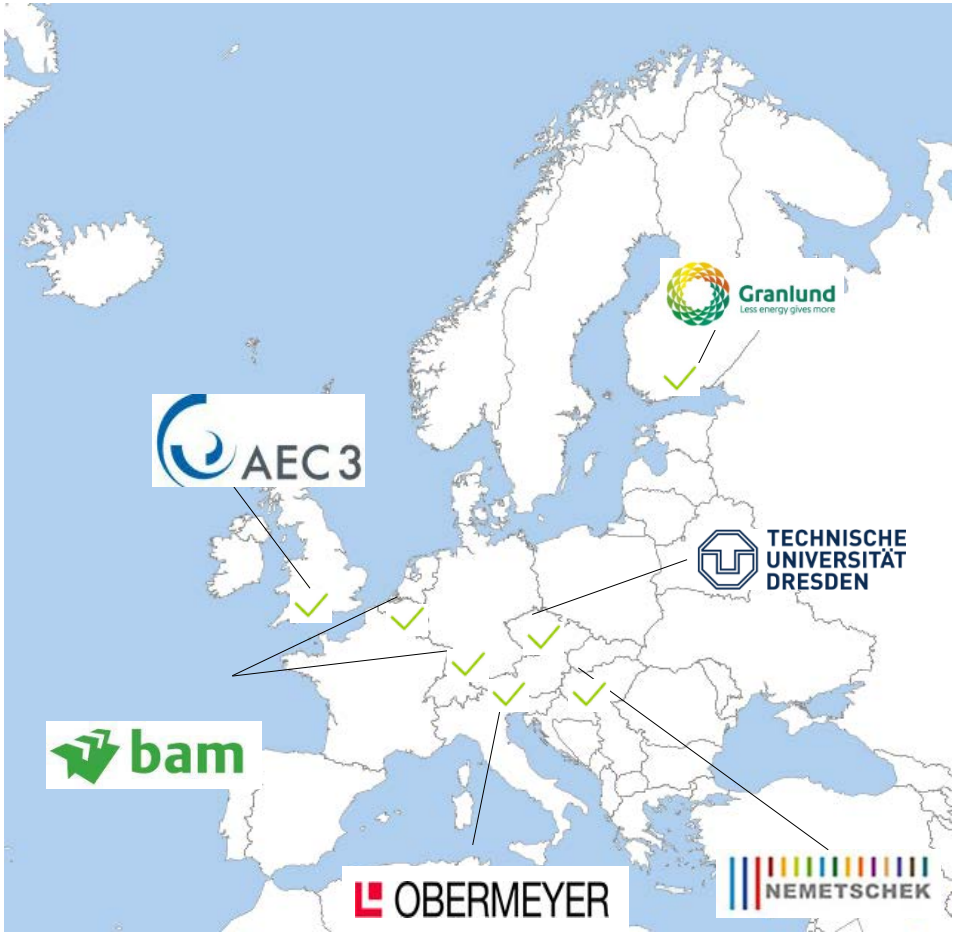
HESMOS Research Project: Objectives

- **HESMOS = H**olistic **E**nergy **E**fficiency **S**imulation and Life Cycle **M**anagement **O**f Public Use Facilitie**S**
- Development of an **Integrated Virtual Energy Laboratory (IVEL)** for energy optimisation and life cycle management of Public Private Partnership Projects.



HESMOS Research Project: Objectives



Project duration
2010 - 2013

Project partners

- TU Dresden (CIB, TIS, IBK)
- Obermeyer Planen und Beraten
- BAM Deutschland AG /
- BAM Utiliteitsbouw BV
- Olof Granlund
- Nemetschek
- AEC3

Homepage
www.hesmos.eu

Newsletter
http://www.hesmos.eu/news/index.php

HESMOS Research Project: Objectives

Improve Process

→ Efficiency / Costs

→ Quality

- Standards
- Interoperability
- User Interface
- Easy access
- Structure
- Transparency
- Consistent data

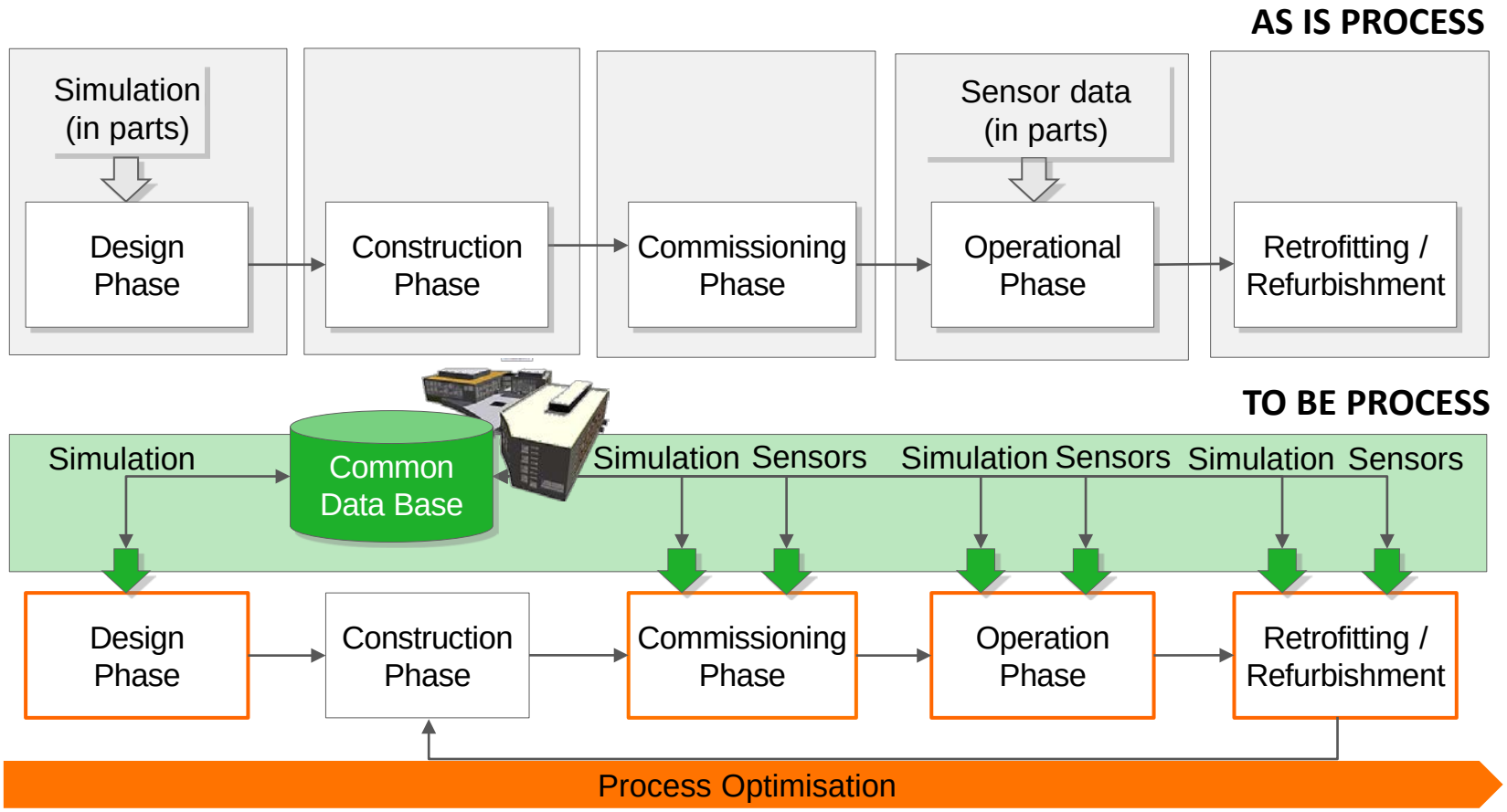
Improve Building

→ Efficiency / Costs

→ Quality

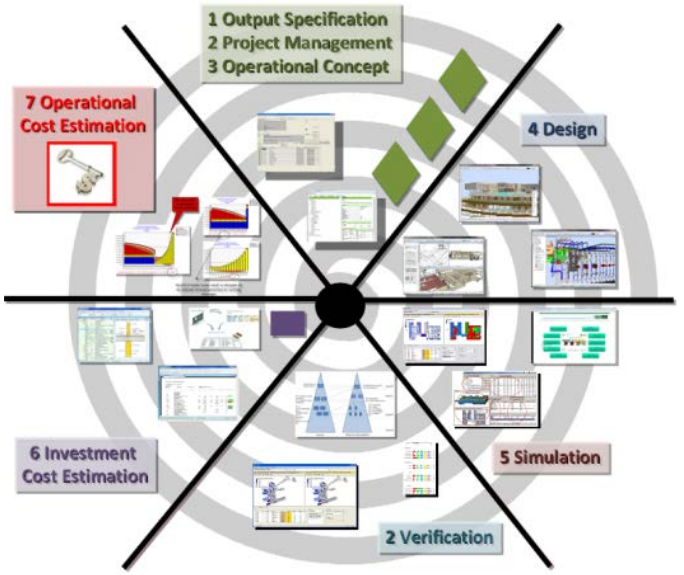
- Simulation
- Building Automation Systems (BAS)
- Before / After comparisons
- Target performance comparisons
- Alternatives

HESMOS Research Project: AS IS vs. TO BE Process



HESMOS Research Project: AS IS vs. TO BE Process

Is (state of the art)	> Should be (future)
2D drawings	> Model based engineering, estimation etc
Re-enter data	> Re-use data
Slow partial round trips	> Fast iterations incl. performance prognoses
Rule of thumb	> Decision support by simulations and historical data
Manual verification	> Digital verification
Few alternatives	> More alternatives
Off the shelf values	> Validated simulation
Many different platform dependent tools	> Best of breath toolset



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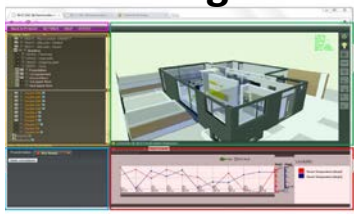
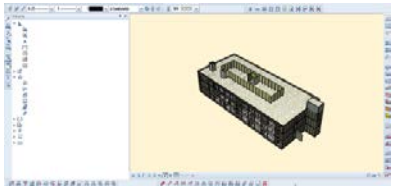
Integrated Virtual Energy Laboratory

nD Navigator



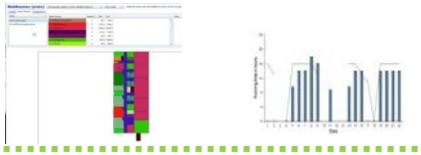
CAD



IVEL

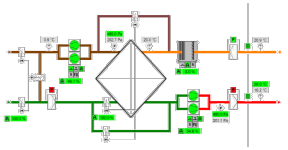
Facility Management

WebROOMEX Granlund Manager



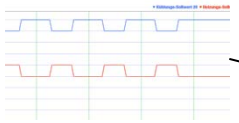
Simulation

BAS

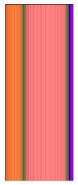


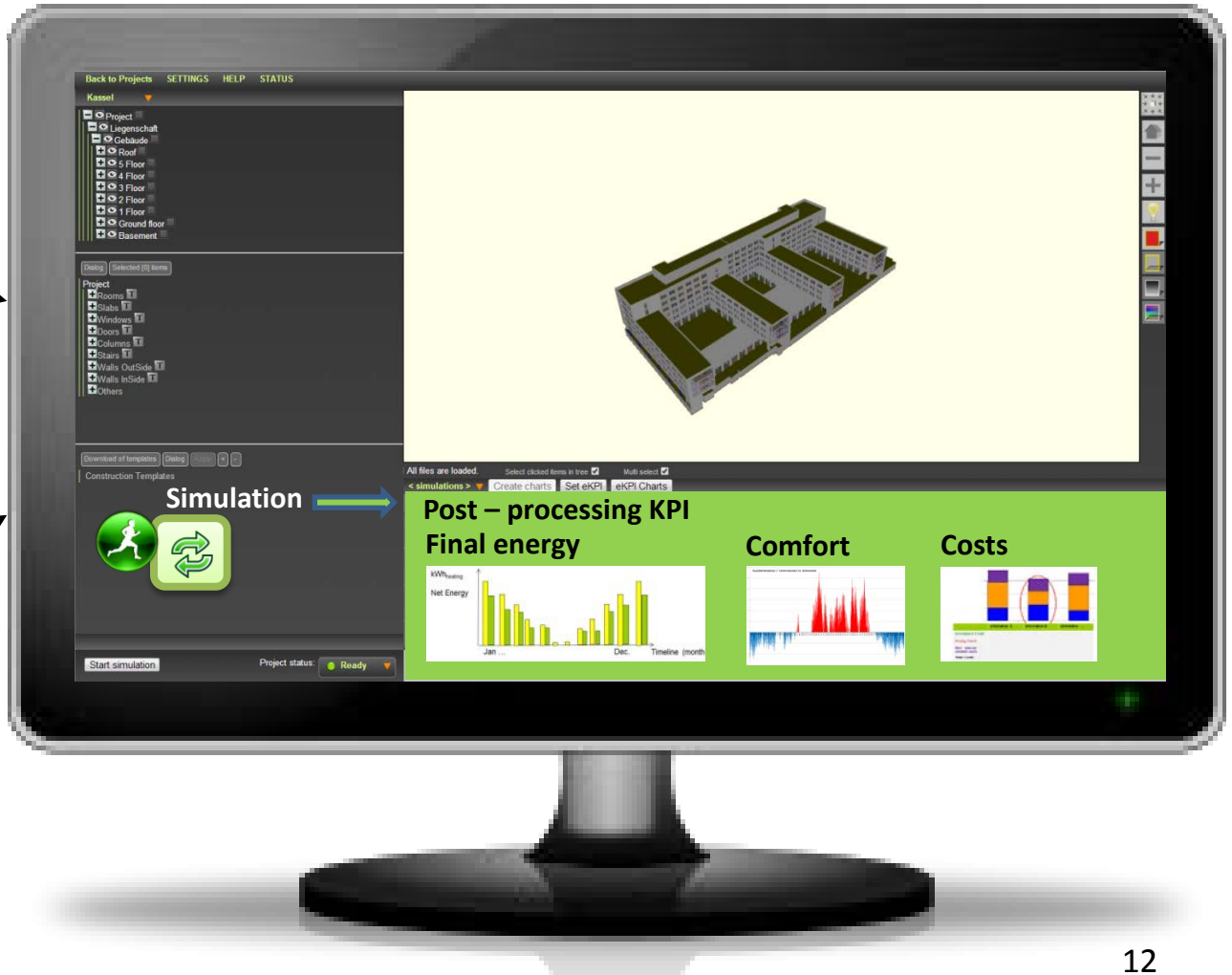
Integrated Virtual Energy Laboratory: nD Navigator

Client requirements



Material layers & building physical parameters

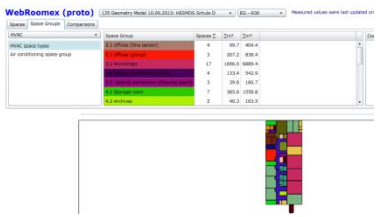




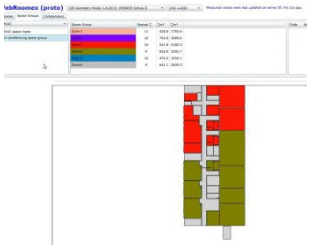
Integrated Virtual Energy Laboratory: WebROOMEX

Spaces & zones

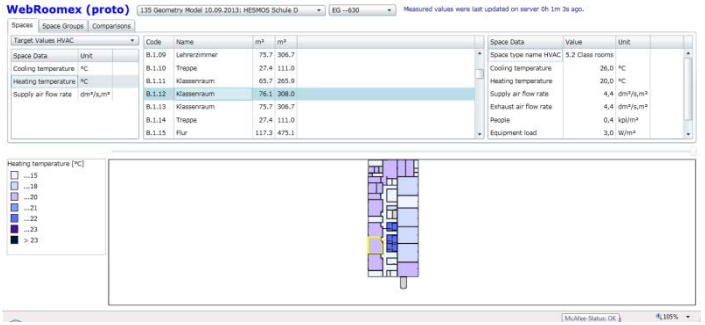
Space types



AHU zones

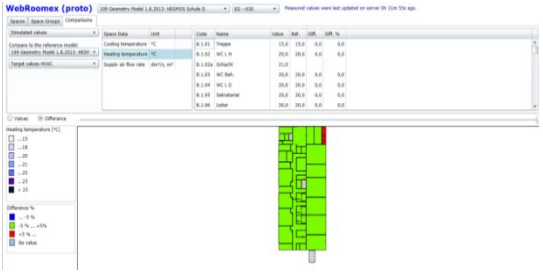


Target values

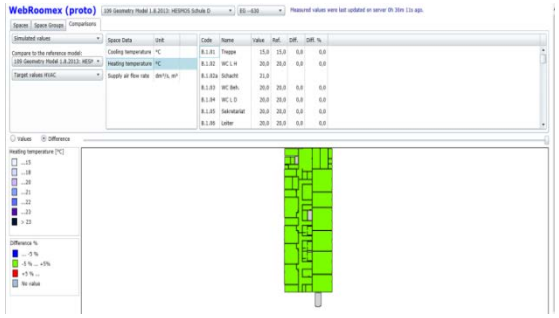


Comparison of target with simulation & measured values

Actual

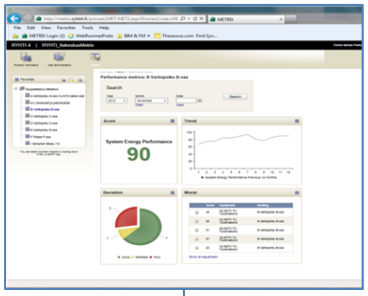


Optimised

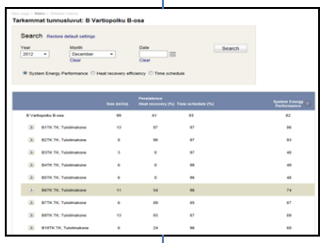


Integrated Virtual Energy Laboratory: Granlund Manager

Overview
Performance
Metric



Data
heat recovery
efficiency



Data
time schedule
efficiency

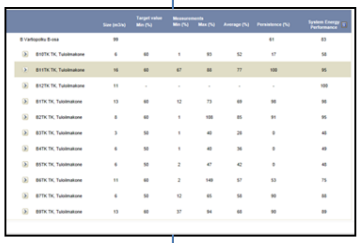


Chart
heat recovery
efficiency

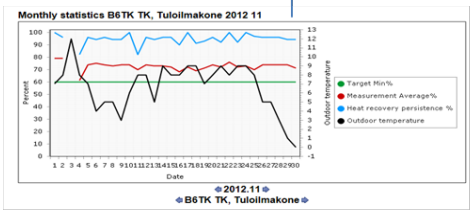
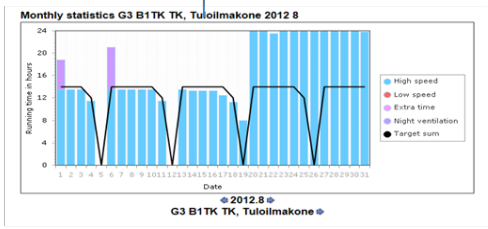


Chart
time schedule
efficiency



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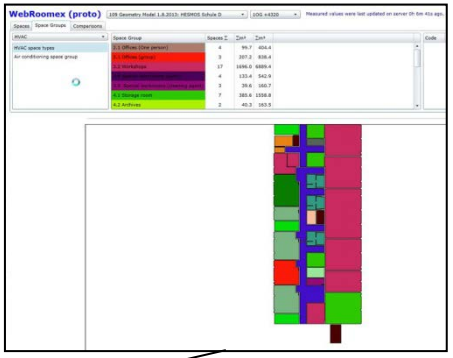
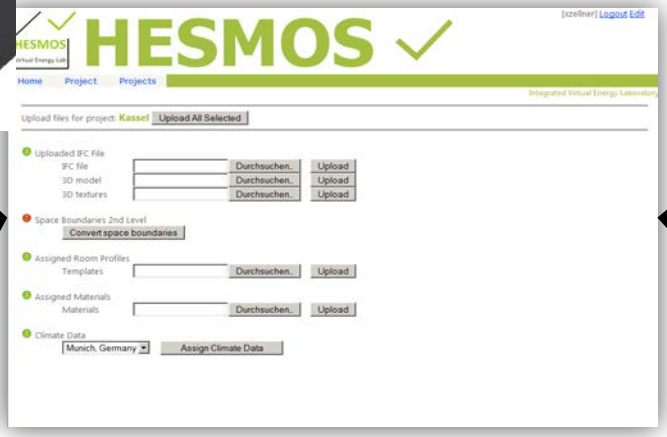
Implementation on Pilot Project

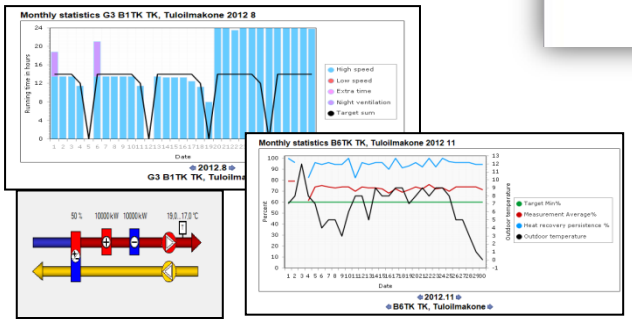
BIM

Client requirements



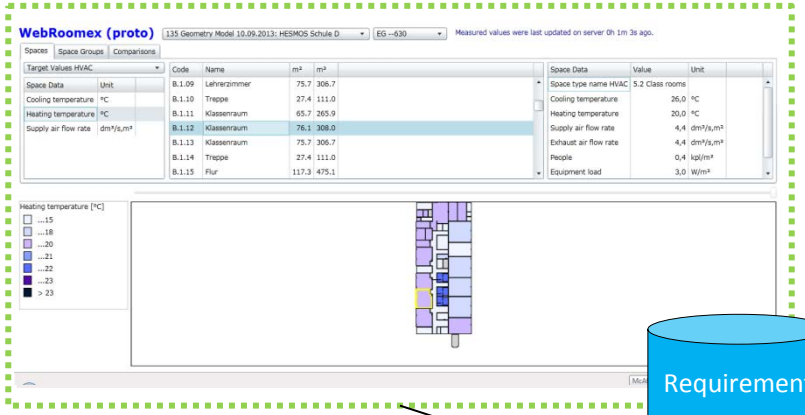


Performance Indicators

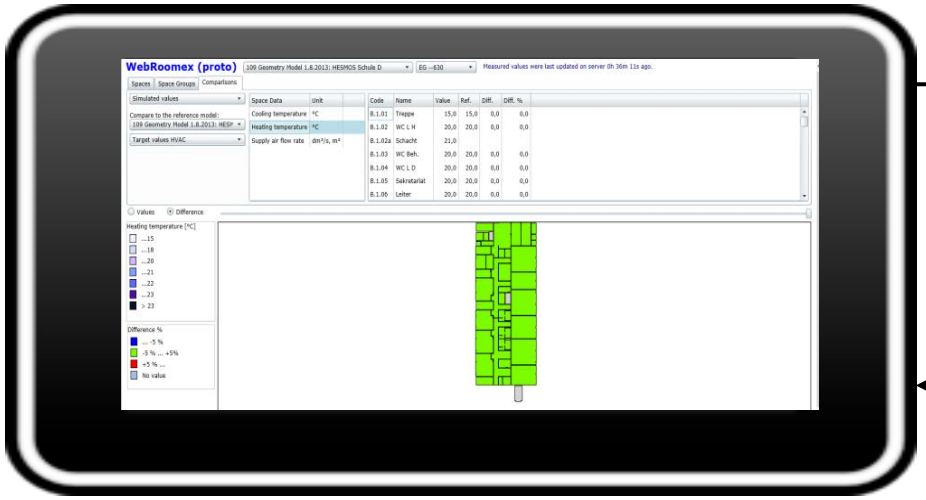


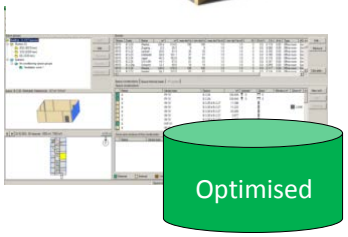
Sensor data

Implementation on Pilot Project: WebROOMEX Use Case

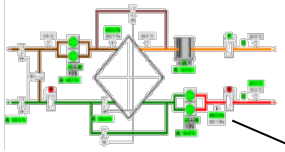


WebROOMEX: Continouus target –performance comparison





Implementation on Pilot Project: Granlund Manager Use Case

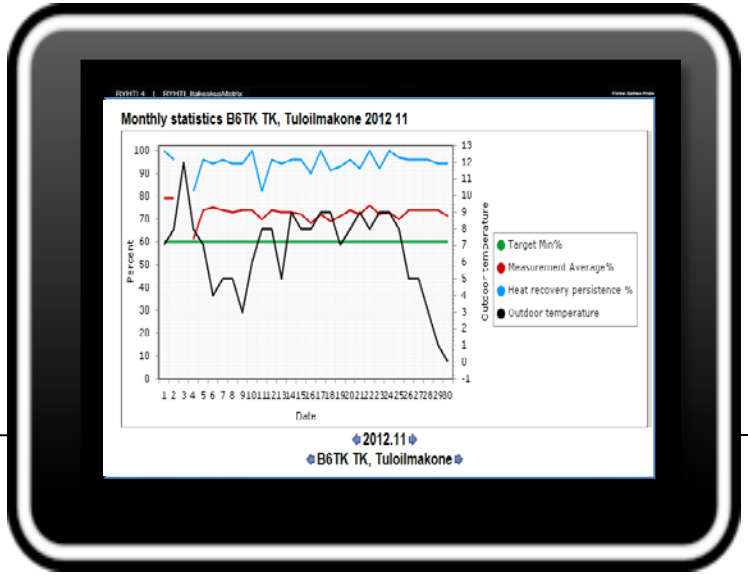


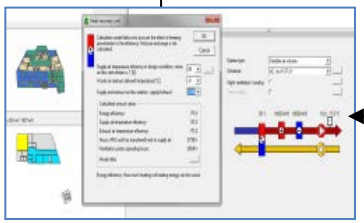
System Performance
ventilation equipment

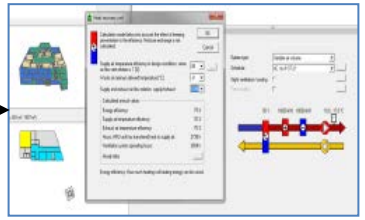
Sensor

Granlund Manager Metrix

Requirements







Sensor

Optimised

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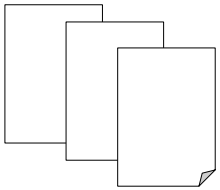
Benefits of IVEL

State of the Art

As - built building data
2D .dwg plans

Manual evaluation for energy report



Meter data acquisition evaluation with BAS interface

HESMOS Development

simulation

Integrated target – performance comparison / energy report

Measured data

Benefits of IVEL

Building quality

- √ Energy and CO_2 reduction.
- √ Fullfilment of user requirements.

Building costs

- √ Optimised life cycle costs.
  - Investment costs.
  - Operational costs (energy costs).

Process time

- √ Fast and intuitive access to BIM data.
- √ Remote access to BAS data.
- √ Standardisation of processes to increase efficiency.

Process quality

- √ Consistent up to date data.
- √ Transparent visualisation of data.
- √ Standardisation of processes to mitigate risks.

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Conclusions: Decision-making and monitoring with HESMOS IVEL

Implementation of the IVEL on BAM pilot projects verifies **optimisation of building and processes**

→ increased quality
→ increased efficiency

Lake Constance 5D-Conference 2013

HOCHSCHULE KONSTANZ UNIVERSITY OF APPLIED SCIENCES

HESMOS Virtual Energy Lab

Public WORKSHOP

November 28th, Amsterdam,
hosted by BAM

Register for participation & webex
www.hesmos.eu >> Events
(only registered participants can attend)

Actual

Optimised

Who should attend?
property owners, energy-, simulation-,
bim experts, architects, consultants, general contactors.

Meeting location:
Amsterdam-Rai, 15 Min. from Airport

Let's discuss does, don'ts & opportunities!

More Info, visit Hesmos.eu

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