We provide a space with solutions

Challenges in BIM for FM: The building owners perspective

NOV ARC Conference, Tallinn

David Helander

02.10.2014

Senate PROPERTIES

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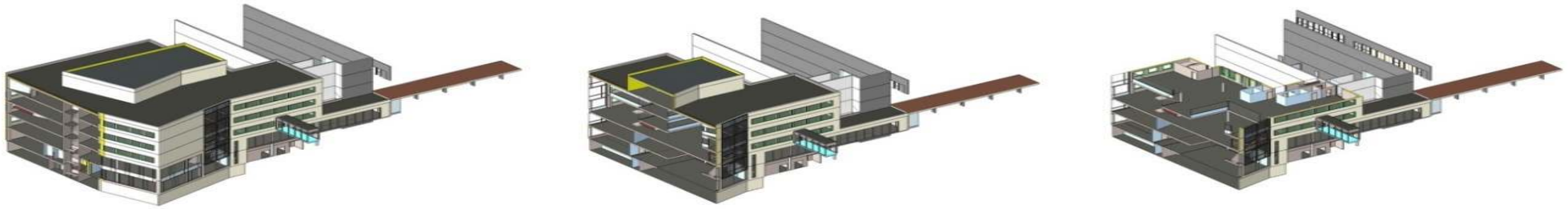
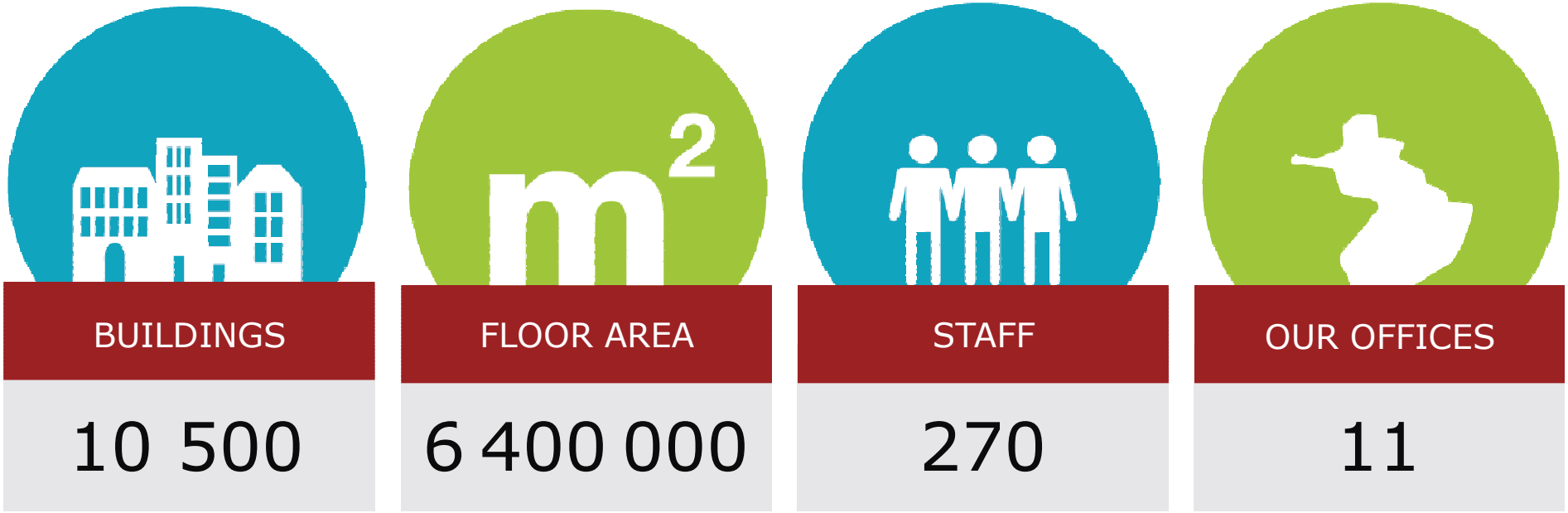


THL (2013)

Senate Properties' key figures



- Senate Properties is a state owned enterprise specialising in working environments and premises

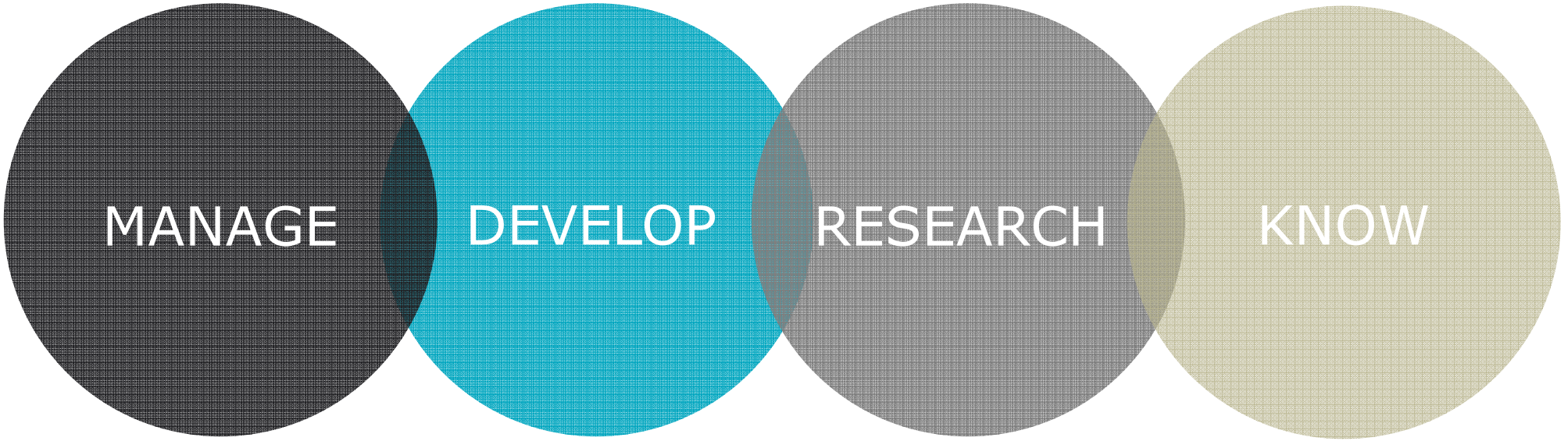
Senate Properties' key figures

BOOK VALUE OF PROPERTIES	TURNOVER	INVESTMENTS
4,5 B €	630 M €	199 M €

RETURN ON CAPITAL, RENTAL OPERATIONS	RETURN ON CAPITAL, ALL OPERATIONS	RENOVATIONS
3 %	3,9 %	~70%

NET RESULT	EQUITY RATE
122 M €	66 %

Expert services



Strategic premises management

Developing the Work environment

Procurement and leasing of premises

Management of premises and the environment

Business areas

Property assets, EUR millions

1 276

1 621

1 066

261

BIM and information management at Senate Properties

BIM at Senate Properties

- BIM required in all over 1 M€ investment projects since 2007
  - 20% of all projects (46/218)
  - 90% of total investment
- BIM requirements in construction projects
  1. Senate Properties' BIM requirements 2007 -> COBIM 2012
  2. Specific BIM requirements in the project program
  3. Additional requirements for large and challenging projects

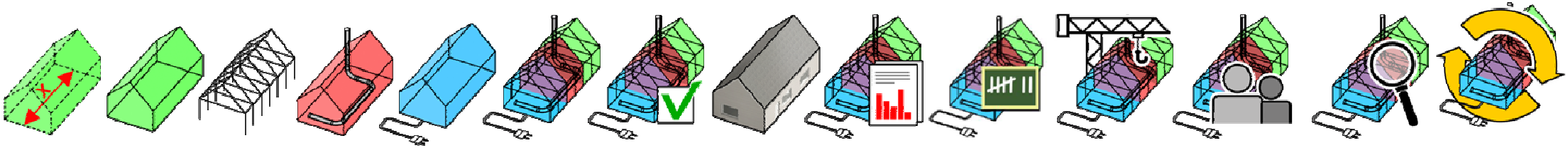
Haka 6 (2008)

Common BIM Requirements 2012

Common BIM Requirement 2012, COBIM, is based on the BIM Requirements published by Senate Properties in 2007. The update project was funded by Senate Properties in addition to several other real estate owners and developers, construction companies and software vendors. Building SMART Finland participated also in the financing of the project.

As a result, the updated Series 1-9 and new Series 10-13 were released in Finnish on March 27th 2012. Part 14 was released in 2014, but it is not yet translated to English.

1. General part
2. Modeling of the starting situation
3. Architectural design
4. MEP design
5. Structural design
6. Quality assurance
7. Quantity take-off
8. Use of models for visualization
9. Use of models in MEP analyses
10. Energy analysis
11. Management of a BIM project
12. Use of models in facility management
13. Use of models in construction
14. Use of models in building supervision



http://www.en.buildingsmart.kotisivukone.com/3

From Research and Development to Business

Gathering Experience from Pilot Projects

- PM4D – Product Modelling 4D 2001-2002
- VIP – Virtual Investment Process based on BIM 2002-2006
- REBIM – BIM for the Real Estate Business 2006-2008

Standardizing Information Delivery

- Senate Properties' BIM Requirements 2007
- COBIM – Common BIM Requirements for Finland 2012

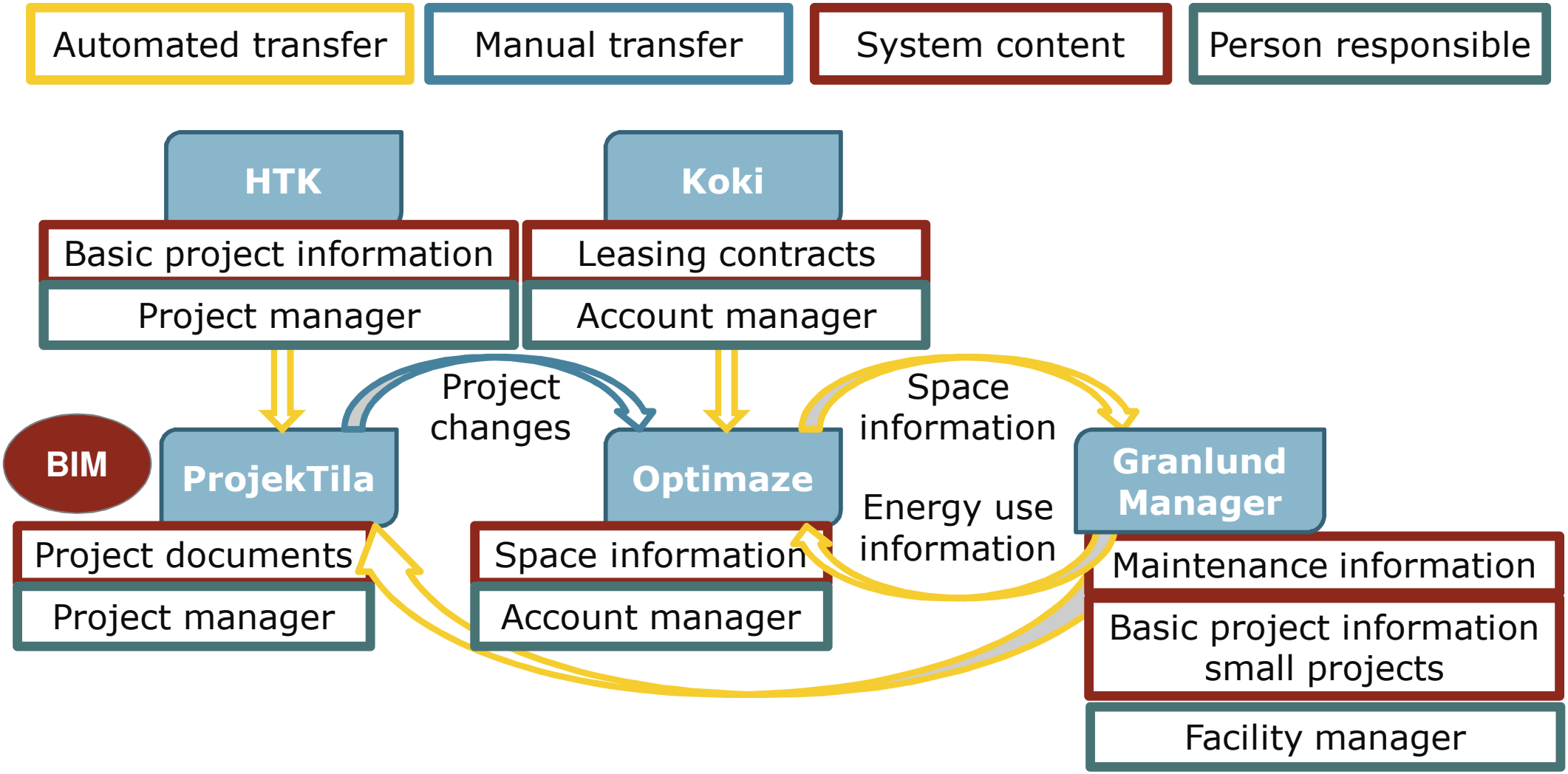
Recent and on-Going Participation in R&D

- PRE – Built Environment Process Re-engineering 2010-2014
- ELVYKOR 2011-2013
- HOLISTEEC (EU) 2013-2016

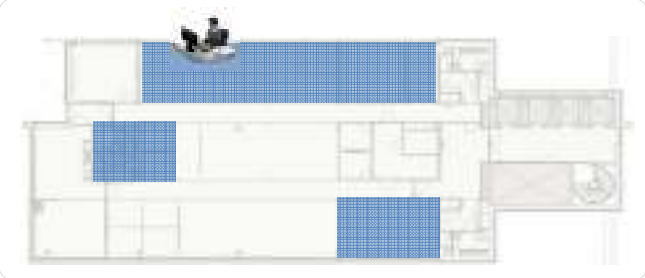
Case Studies

- National Institute for Health and Welfare (THL) 2012-2016
- Syväniemi School and Daycare Center 2012
- Onerva Mäki School 2013
- Ministry of Employment and the Economy 2013
- Senate Properties Spearhead Model 2013->

Building information systems at Senate Properties



Optimaze - Space management system



Floor Plans

Lease Agreements´ Management Register

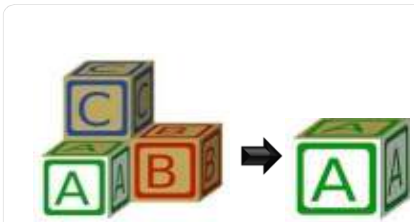
Map

IT-environment

Facility register

Reporting Channel

Space Usage Planning Tool



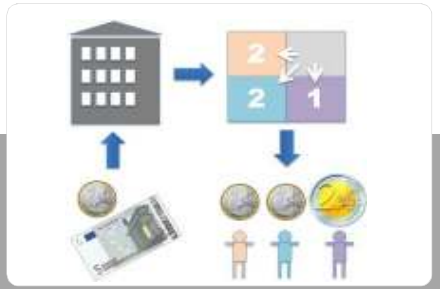
Environmental Calculations / Carbon foot print

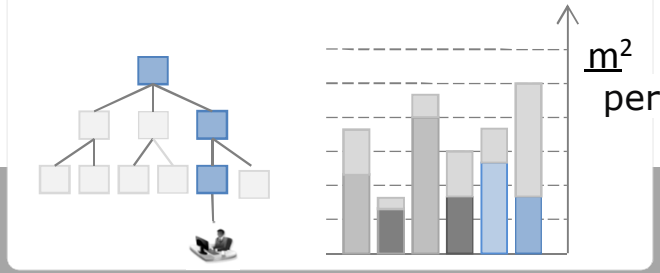
Space Cost Tools

Space Management Tools

kW h

CO 2





Optimaze - Space management system

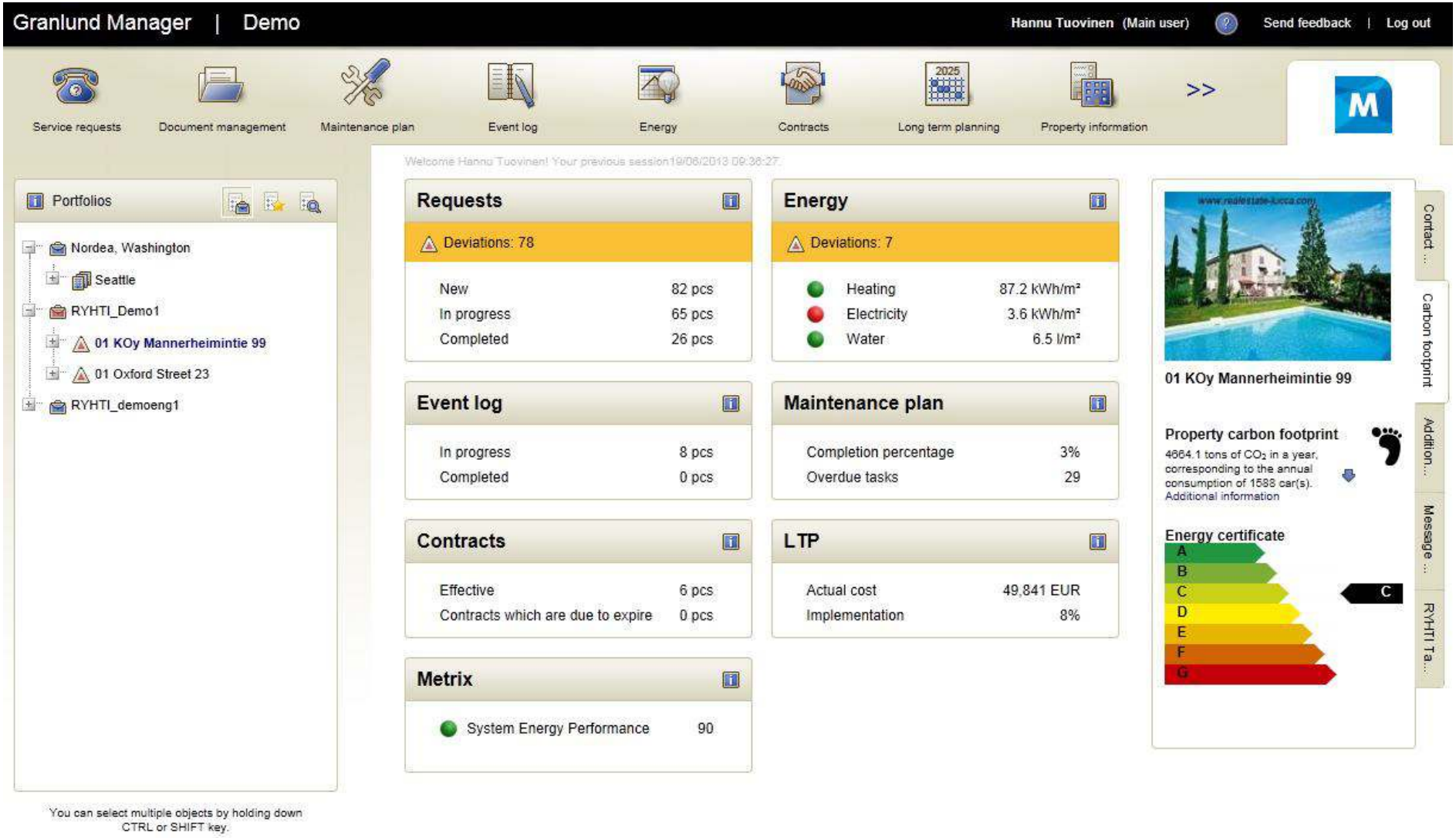
- Optimaze.net
  - a web-based tool for efficient corporate real estate management

  - **Property management** modules
    - Rental agreement situation (past, now and future situation)
    - Building register and drawings
    - Integrated with Koki (rental agreement creation and management tool)
    - We do not connect our service level agreements to floor plans (yet)
    - Profitability calculations are made in other system
  - **Facility management** modules
    - Senate uses these in own premises/space management and offers the same software and service to all ministries and government agencies (like tax administration)
      - Big implementation process is going on at the moment

Space management system includes:

- Rental agreements and floor plans management
  - rental agreements are connected to floor plans)
  - Location in maps
- Use of Space management
  - organisation/space users are connected to floor plans → possible to report e.g. space efficiency measures (m2/person etc.)
- Space cost allocation and management
  - Sophisticated cost allocation to business units based on space categories and employees' day-to-day space usage
- Environmental calculation
  - Energy consumption (and business travelling)
  - Carbon footprint
- Many Reports
- Own "channel" for sharing information within organisation

Granlund Manager



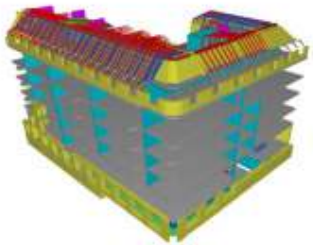
Challenges in BIM for Facility Managemet

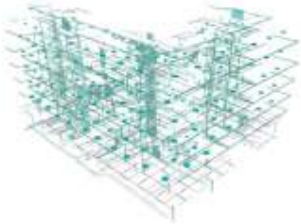
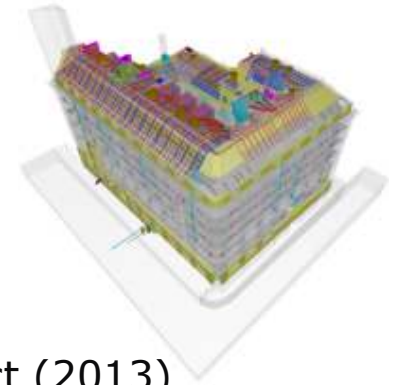
BIM for FM – long term target

- Complete as-built model from the construction phase
  - Model including the contractors changes, and device information
  - Information transfer and integration to CMMS (GM, Optimaze)
- BIM (IFC) compatibility with CMMS (GM, Optimaze)
  - locate building parts
  - query vacated space
  - simulate and visualize the effect of taking a service out of commission
- High customer satisfaction through
  - visualization of spaces
  - real time space information
  - user-friendly feedback system

Challenges with as-built models

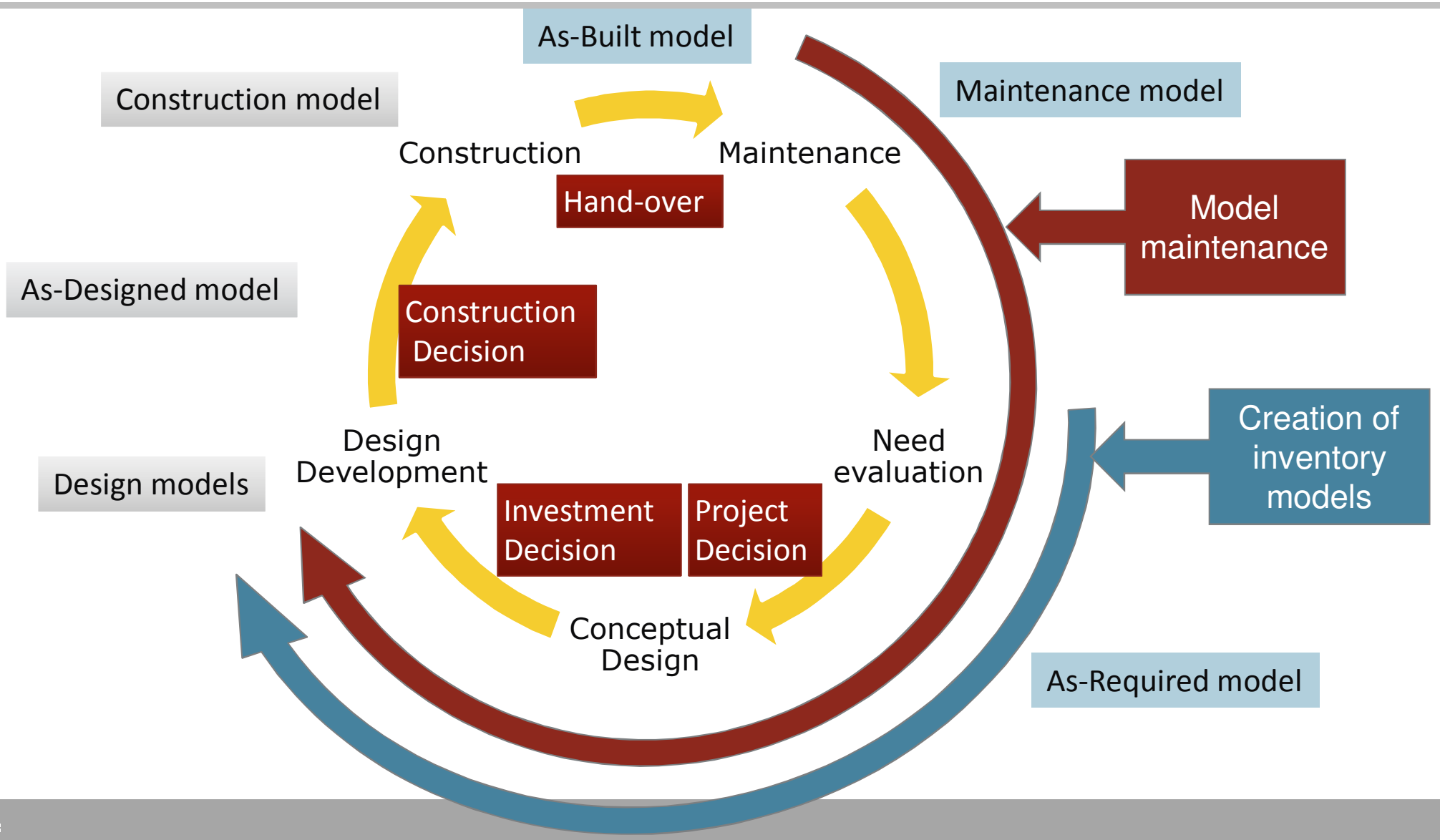
- How to get all the contractor's changes into the model?
  - Installation of similar but not the same devices as designed
  - Sub-contractors' use of models
- Which information is really needed in the maintenance phase?
  - How to find the useful minumum information requirements
- How to maintain the models in the long run?
  - Which models to be maintained, by whom?
  - Which information should be maintained?

Renovation project (2013)

Phase specific evaluation of model benefits and usability



Challenges with Optimaze

- IFC models can not currently be integrated into Optimaze
  - IFC models can be used to create floor drawings
  - Manual work needed when integrating model objects
    - Different object libraries
  - Models easier to use than 2D-drawings

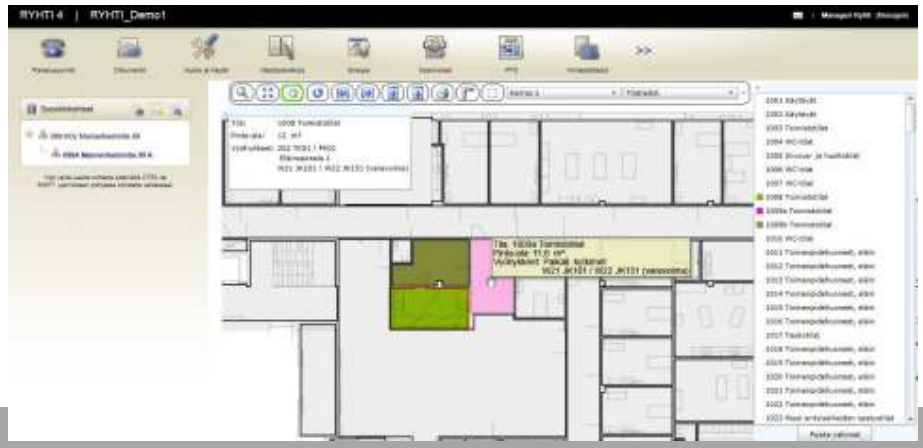
- Challenges in getting wanted / accurate areas from a model
  - Leased areas not standardized
    -> difficult to model

Granlund Manager: Challenges and system development

- Granlund Manager does not currently support IFC

- Optimaze floor plans are soon to be integrated into GM
  - Possibility to locate devices from floor plan
  - Information manually entered and linked in GM
  - Are 2D-plans enough?

- Granlund Metrix: database for building automation
  - Sensors can be linked to floor plan



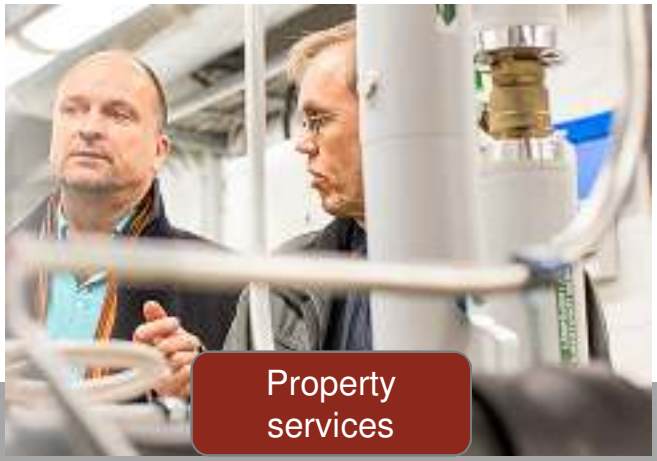
Current development at Senate Properties

Under development - Indoor measurement model (IMM)

- The IMM means a three-dimensional digital model showing real time indoor climate and energy consumption
- The IMM model is based on a combined model, which is connected to building automation, wireless sensors, a live video image, the energy measurements etc.
- Can be viewed on computer, tablet or smart phone
- Allows communication between the tenant, property service company, and the owner

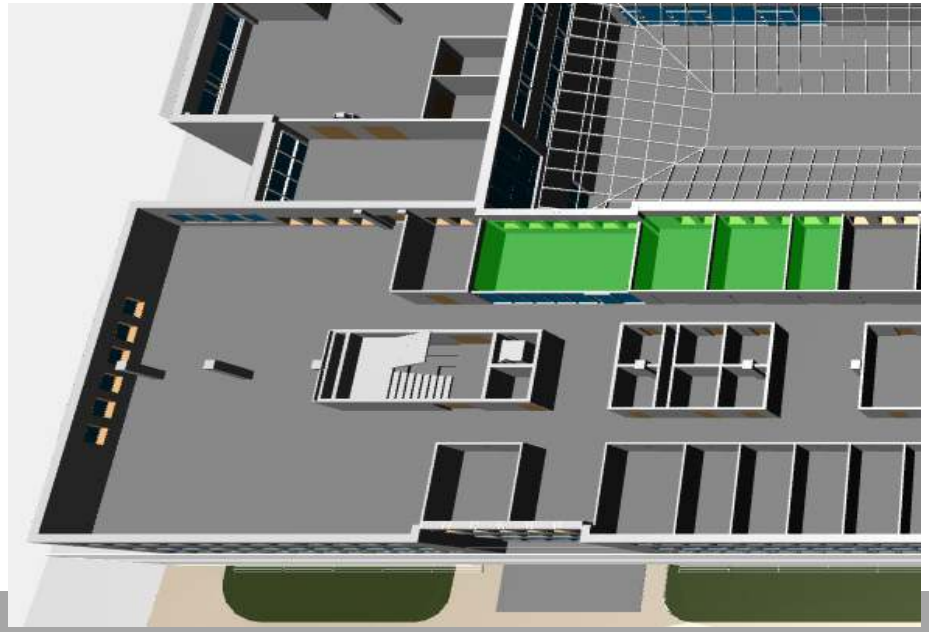
Remote management operation environment

Remote manage-ment center



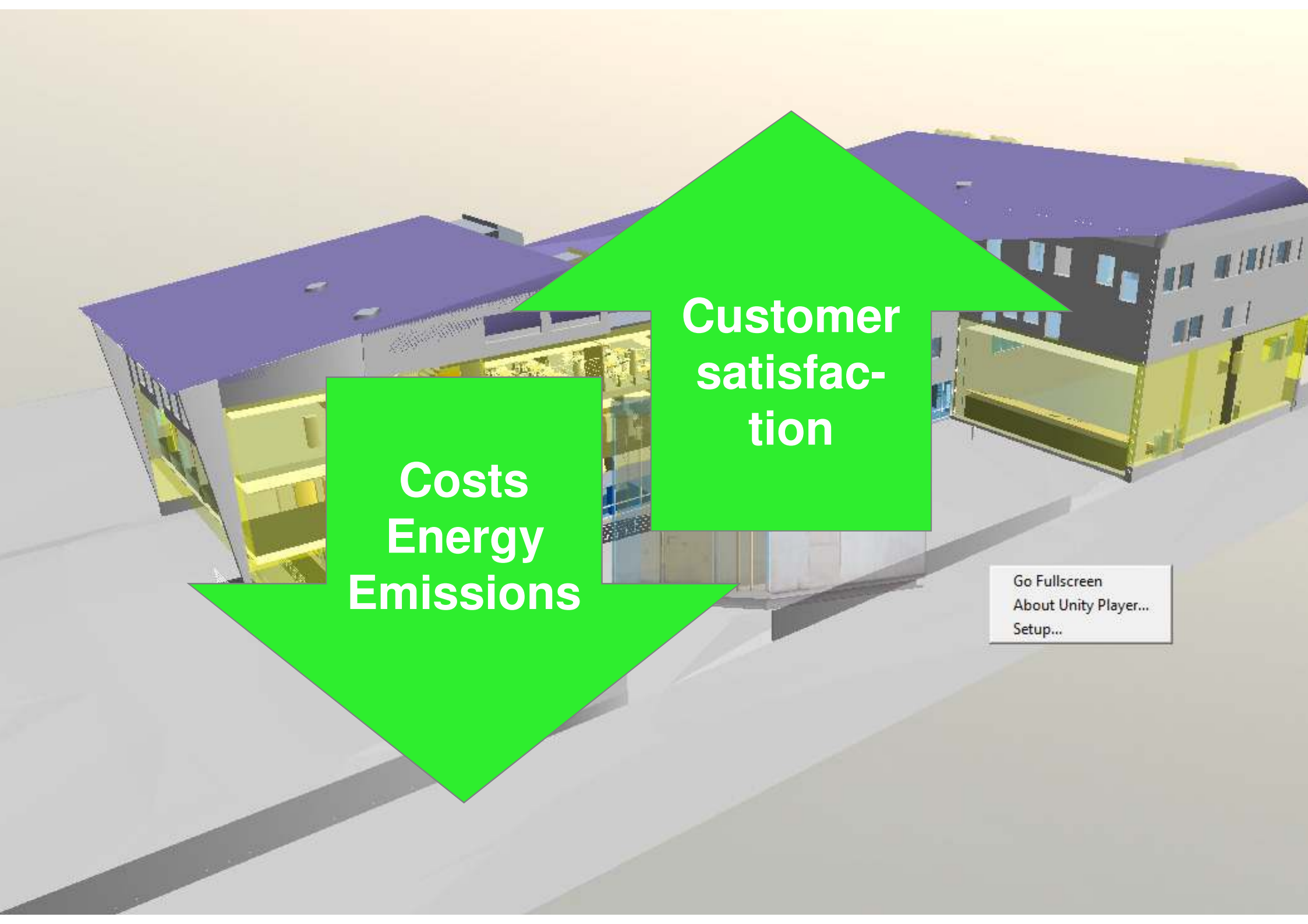
The virtual building in practice

- Useful for all the building's stakeholders
  - User, owner, facility manager
- In the IMM model it is possible to show real-time information about the space's
  - Temperature
  - CO_2 concentration
  - Humidity
  - Requests for service
  - Energy consumption
  - Utilization rate



Info Screens

- The target is to motivate tenants to use energy wisely
- Energy consumption animations
  - Electricity
  - Heating
  - Water use
- Tenant newsletters
- Senate fact sheets
- Tips for smart energy use
- Lunchroom menus
- Weather maps
- Energy certificates
- Etc.


Customer satisfac-tion
Costs
Energy
Emissions
Go Fullscreen
About Unity Player...
Setup...

Next steps and final thoughts

Next steps on the way to BIM usage in FM

- Research on the benefits of BIM in building maintenance
  - Linking of information from maintenance systems to a model
- Useful minimum information content of as-built models
  - Information gathering process in the construction phase
  - Model including accurate space areas for transfer to Optimaze
  - Focus on model quality control
- Develop model maintenance
  - Processes and maintained model content

Final thoughts

What is actually needed from a model in the maintenance phase?

- A maintenance model is not equal to information storage
  - IFC is an information transfer format
  - Information linked from database to model objects

- Three tracks for models in the building maintenance phase
  - Manage the buildings technical information (maintenance manual)
  - Manage spaces, indoor climate, and user feedback
  - Maintain building design & construction models for future projects

We provide a space with solutions

Thank you!

Questions?

David Helander
david.helander@senaatti.fi
+35840 8453207

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