Advanced Virtual Building Software in Finland
-
Tools in a Real Life Building Services Design Process

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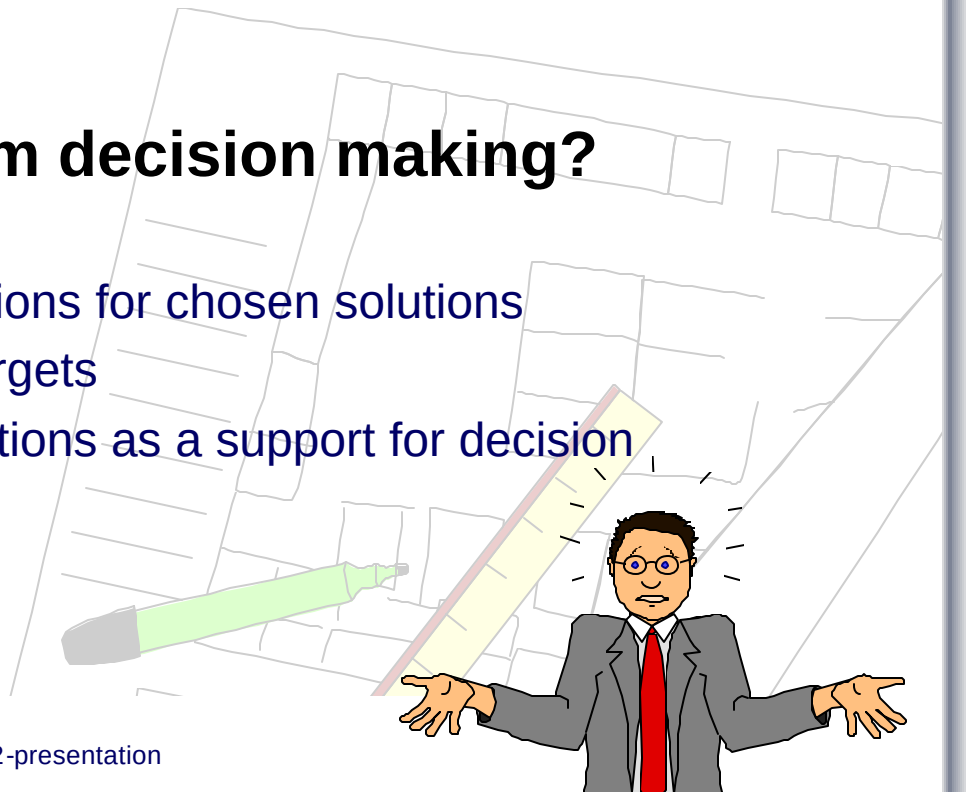
Building Services Design

Traditional way

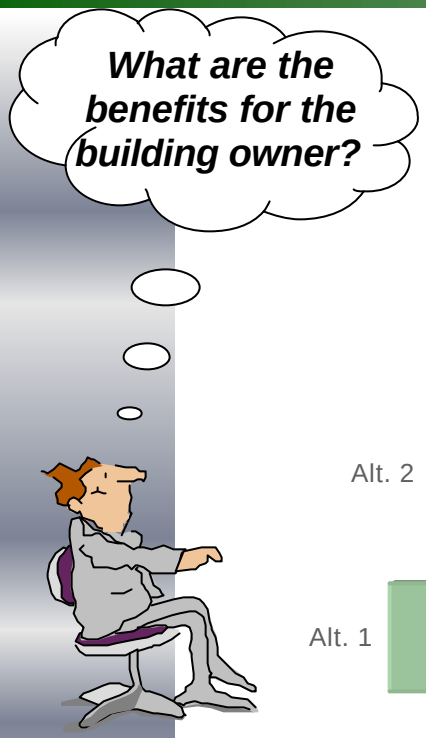
- document based
- 2D-plan drawings and sections
- bill of materials and diagrams

What is missing from decision making?

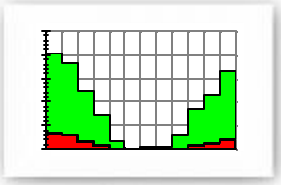
- alternatives
- descriptions and calculations for chosen solutions
- confirmation of design targets
- visualizations and simulations as a support for decision making



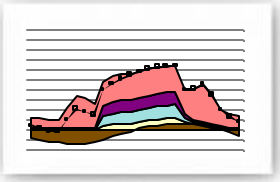
Integrated Tools in Building Services Design



Energy simulations

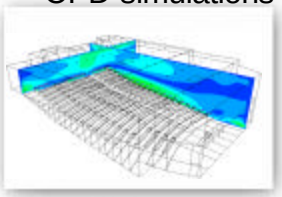


Comfort simulations



Efficient tools support design and clients' decision making from the beginning of the project.

CFD simulations



Alt. 2 SMOG

dwg

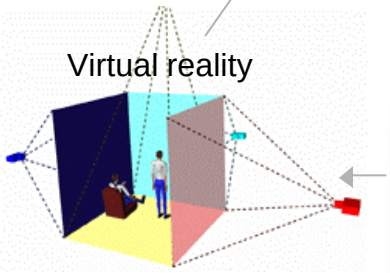
Alt. 1 **Architect design**

IFC

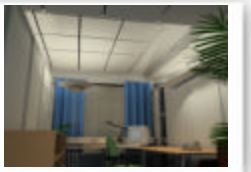
Product model of building

Verification and viewing of product model

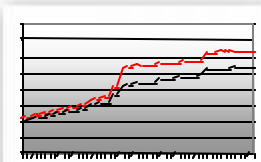
Virtual reality



3D visualizations
Lighting simulations



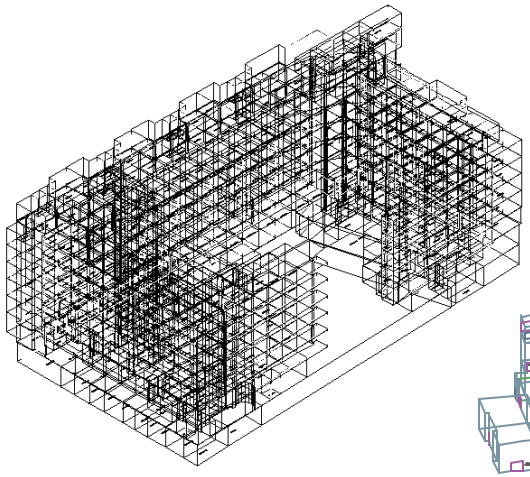
Life cycle analysis
LCC / LCA

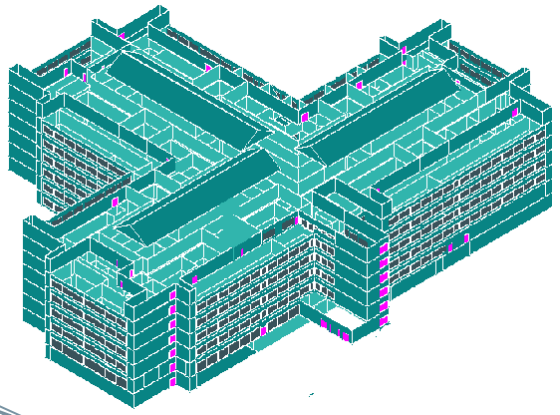


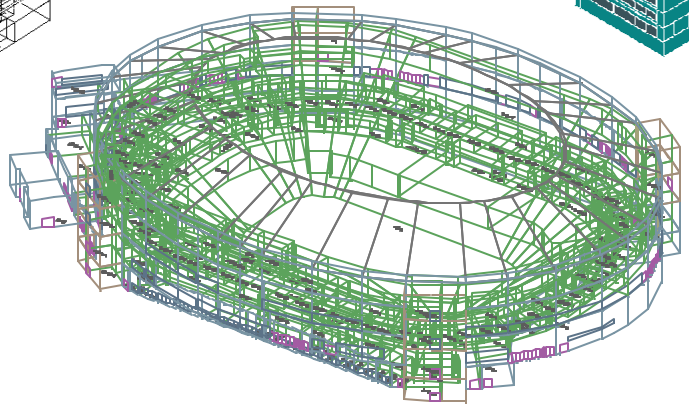
3D Modelling Tool

GRANLUND SOFTWARE SMOG

- 3D modelling for heat loss calculations, energy and CFD- simulations
- Building geometry and structures
- Add-on tool for AutoCAD2002™
- IFC 1.5.1 compliant

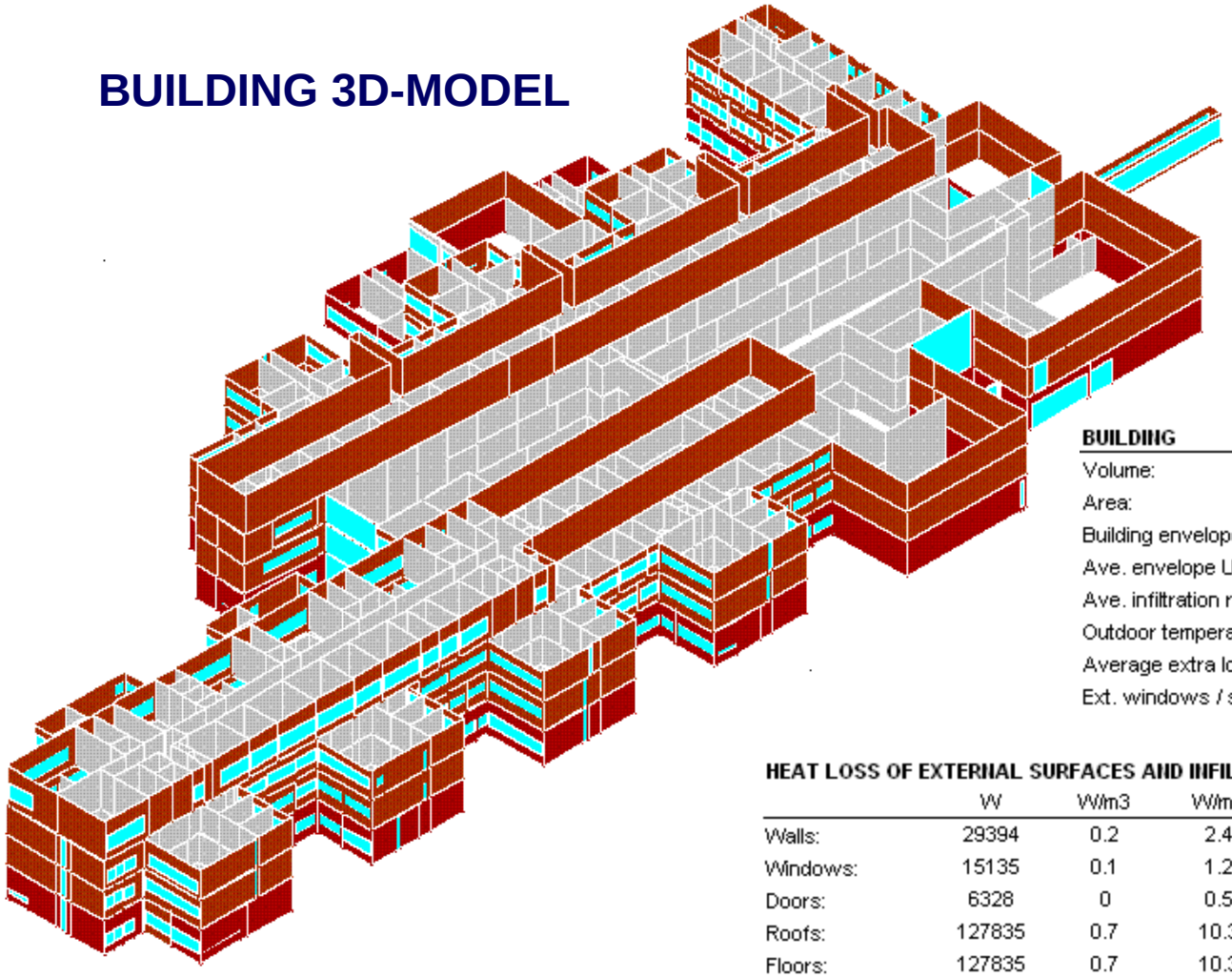






RIUSKA Heat Loss Calculation

BUILDING 3D-MODEL

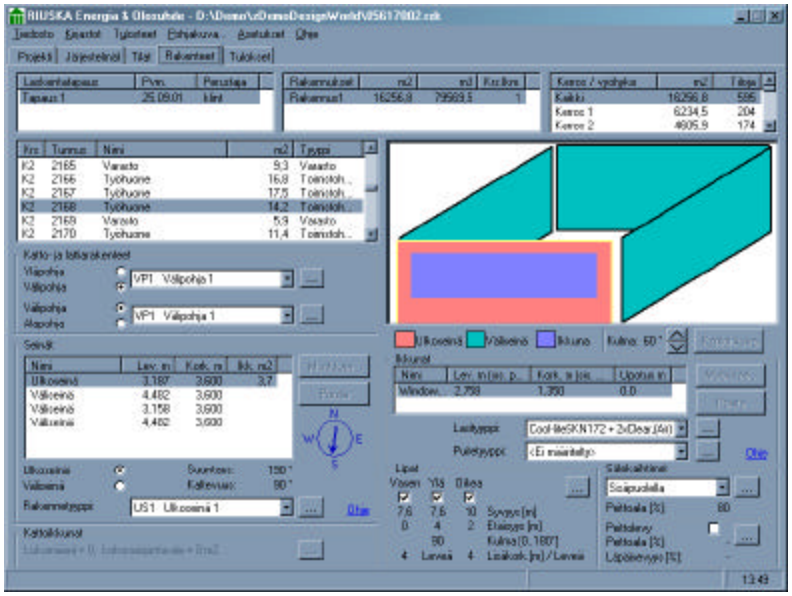


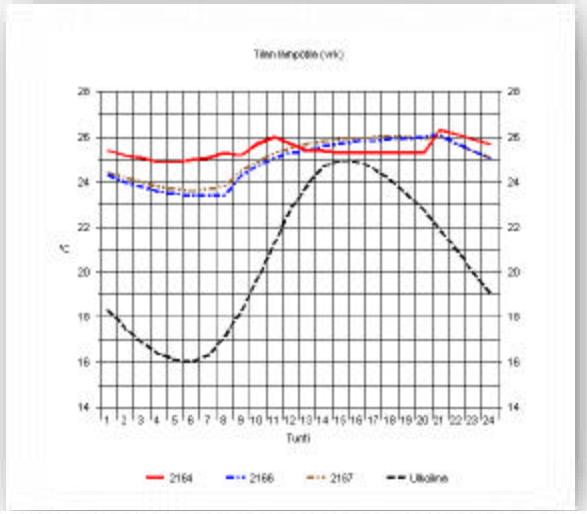
BUILDING		
Volume:	186730	m3
Area:	12363	m2
Building envelope area:	27370	m2
Ave. envelope U-value:	0.2	W/m2,°C
Ave. infiltration rate:	0.08	1/h
Outdoor temperature [°C]:	-26	°C
Average extra loss coeff.:	1.00	
Ext. windows / storey area	2	%

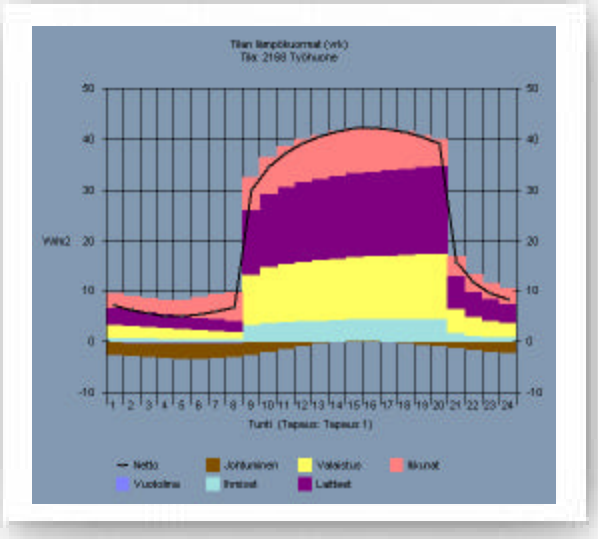
HEAT LOSS OF EXTERNAL SURFACES AND INFILTRATION	W	W/m3	W/m2	%	Finn. Code W
Walls:	29394	0.2	2.4	6	29394
Windows:	15135	0.1	1.2	3	21522
Doors:	6328	0	0.5	1	6328
Roofs:	127835	0.7	10.3	26	127835
Floors:	127835	0.7	10.3	26	127835
Total conduction:	306529	1.6	24.8	63	312915
Total infiltration:	177076	0.9	14.3	37	177076
Total:	483605	2.6	39.1	100	489991

RIUSKA Comfort Simulation

GRANLUND SOFTWARE
RIUSKA

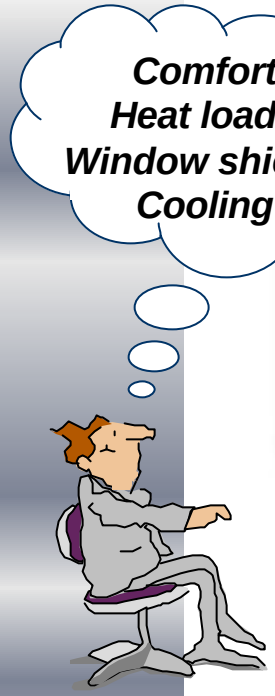


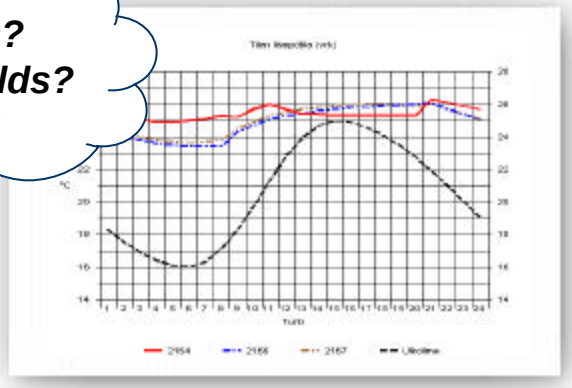




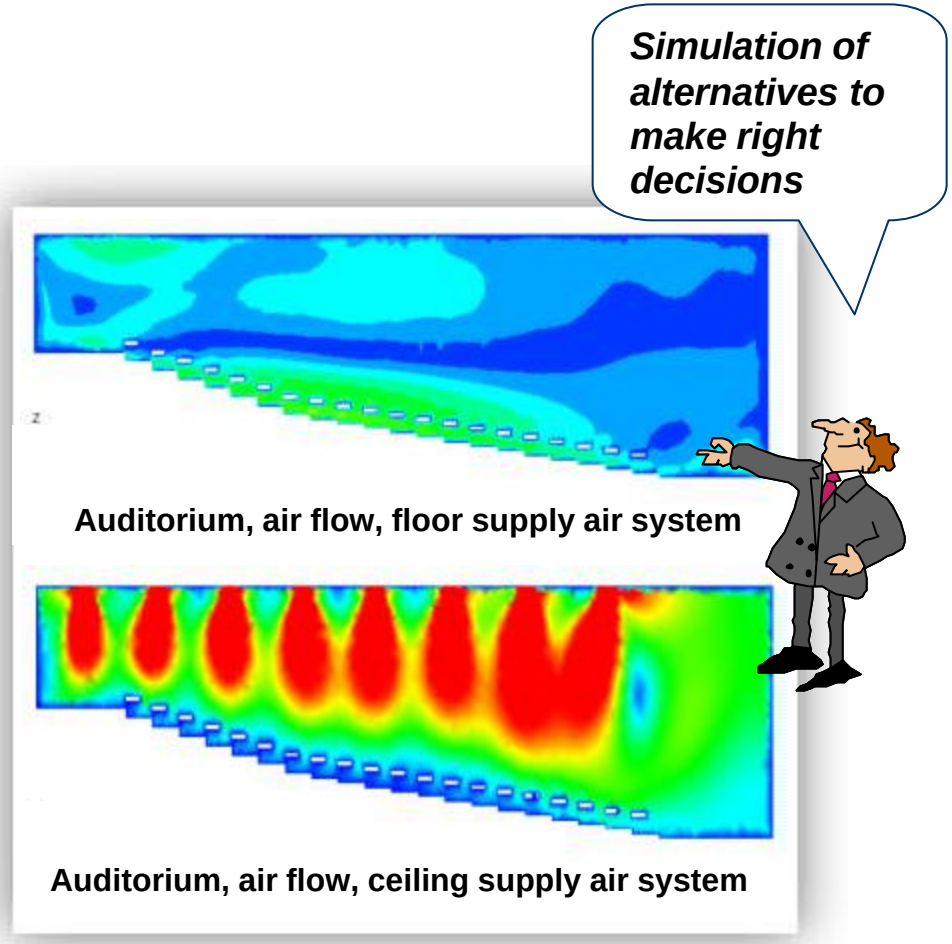
- Dimensioning of air flows and cooling requirement according to target criteria
- Versatile comparisons
- More accurate results in demanding spaces by using CFD

Management of indoor conditions





Comfort simulations – type spaces
- temperature in summer and in winter
- temperature consistency
- window shields
- technical systems

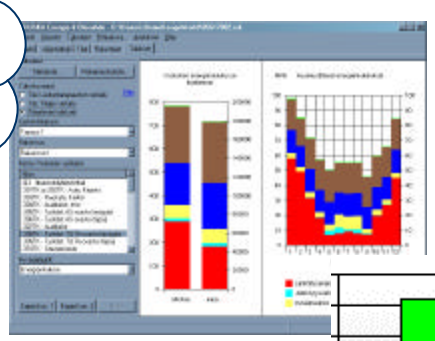


CFD simulations – demanding spaces
- temperature and air flow distribution
- comparison of supply systems
- completition to comfort simulations

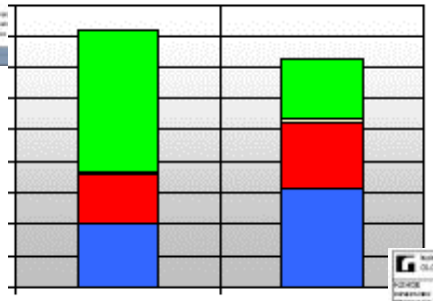
Management of life cycle inpacts

Facades?
Insulation?
Systems?
Materials?

Energy consumption



Life cycle costs (LCC)



Environmental impacts (LCA)

Simulation of alternatives to make right decisions

LCC = Life cycle costs
LCA = Life cycle assessment

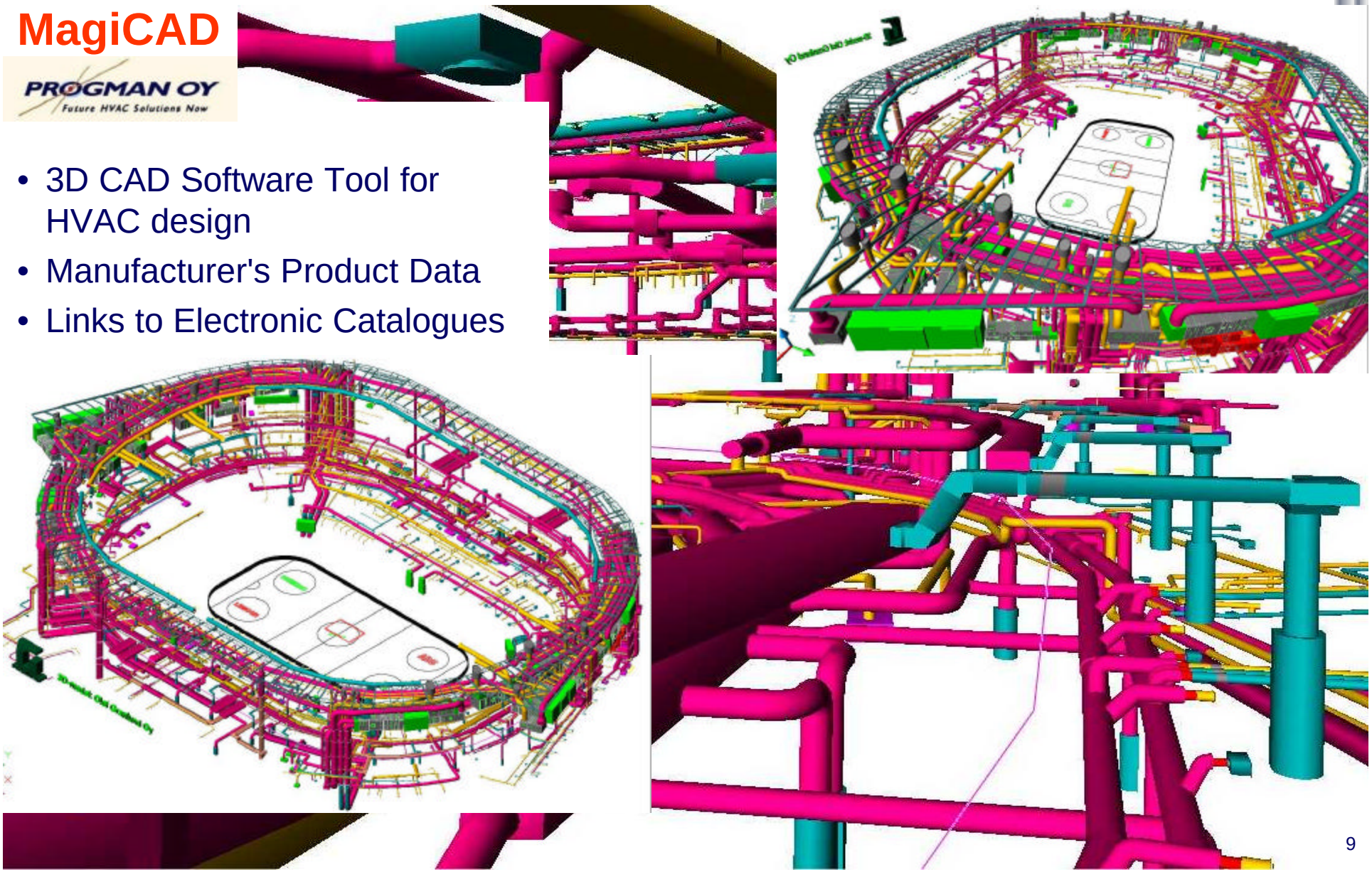
HVAC Design

GRANLUND

MagiCAD

PROGMAN OY
Future HVAC Solutions Now

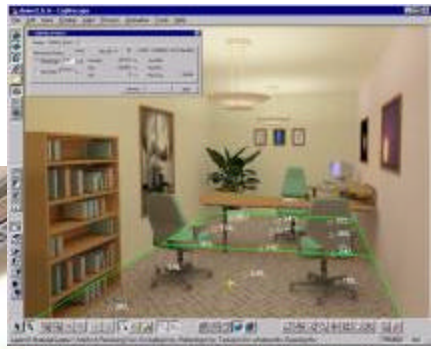
- 3D CAD Software Tool for HVAC design
- Manufacturer's Product Data
- Links to Electronic Catalogues



3D-Visualization and virtual reality

What do the spaces look like?
Lighting? Daylight?
Visible installations?

Photerealistic 3D visualizations
- Architecture
- Lighting
- Building services



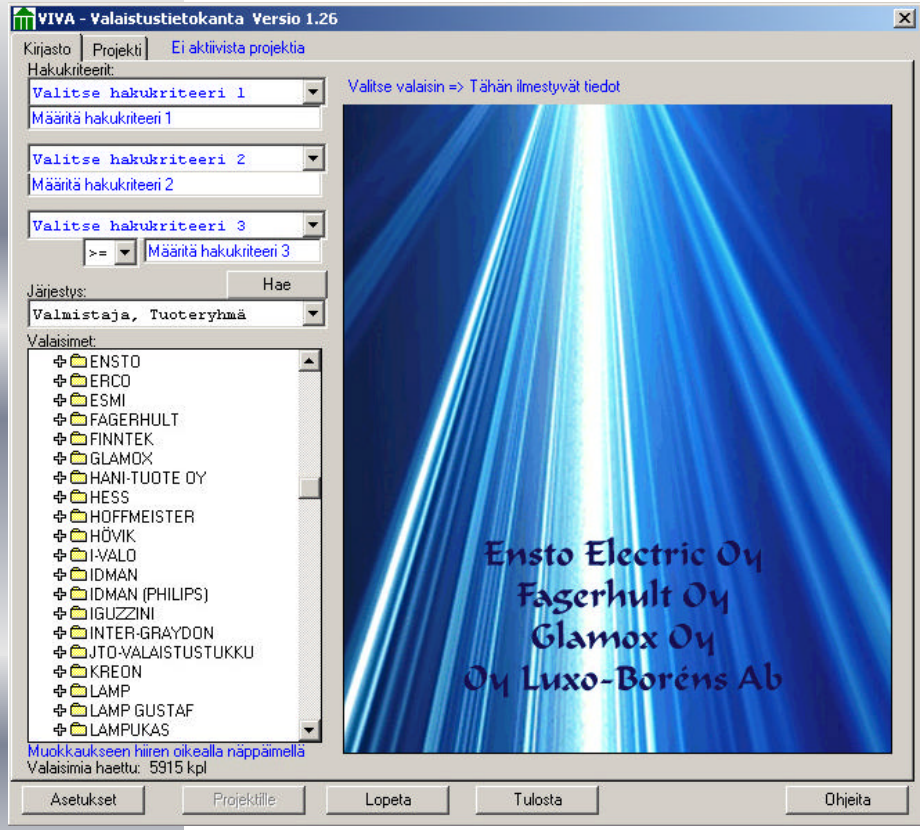
Lighting simulations
- Lighting design based on product model data

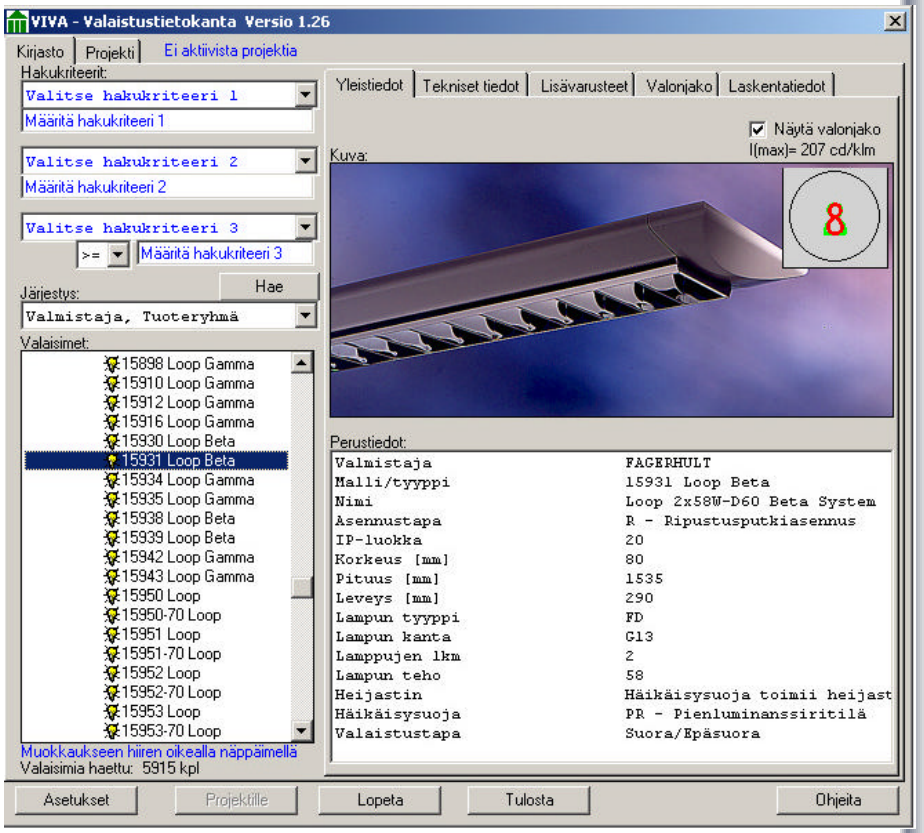
Visiting the virtual building to get better understanding

Virtual reality
- Almost like in a real space
- Alternative to a mock-up room

VIVA Database & Luminaire Selection Tool

- electrical information (basic requirement)
- photo
- photometric information (light distributionin IES-format)





Senaatti

Granlund Software

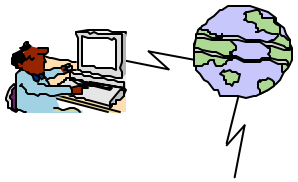
Taloinfo *Reporting facility*

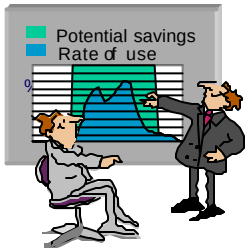
Taloinfo users

Internet/Extranet
- Clients, partners
- Consultants
- FM

Intranet
- Personnel
- FM

AV Info Centre
- Clients
- Personnel





Taloinfo software

Reports

Taloinfo database

Thermal simulation

GRANLUND SOFTWARE RIUSKA

Reporting
Data collection

Building 3D model

LAN/WAN

Building automation
- comfort, operation

Lonix

Access control
- Presence

SECURITAS

Energy measuring
- Consumption

Facilities management
- FM plan and history

GRANLUND SOFTWARE RYHTI

Information systems

Aids for Successful Design

Advanced design tools

GRANLUND SOFTWARE
RIUSKA
MagiCAD ArchiCAD

- Investment in software development
- Cooperating with the most advanced international software developers

Information well-timed for decision-making

IFC™ R2.0
IMPLEMENTATION
Certified in accordance with official IAI facilitated approval procedures for IFC™ Release 2.0 - 23 May 2001

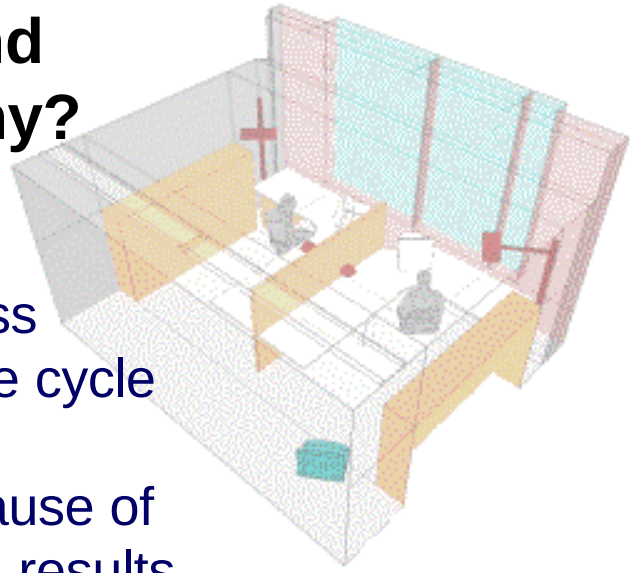
- Suitability for real project schedules
- Interoperability of design tools
- Reusing existing data

True influencing to the result

- Results as an easy-to-understand format
- Visualization
- Virtual reality

Benefits from Product Model Based Design

Biggest beneficiaries are the end users and building owners - Why?



- faster and more reliable design process
- end result is better from quality and life cycle economy point of view
- decision making becomes easier because of alternative analyzing and visualization results
- possibilities to steer the project grows with the help of understandable reports
- product models can be used through the whole building life cycle

Q & A

Thank you!