

Room Control and Indoor Air Quality – Benefits and Environmental Impacts

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Can we reduce our building expenses?

Can we decrease our absenteeism rate?

Can we feel safe in this building?

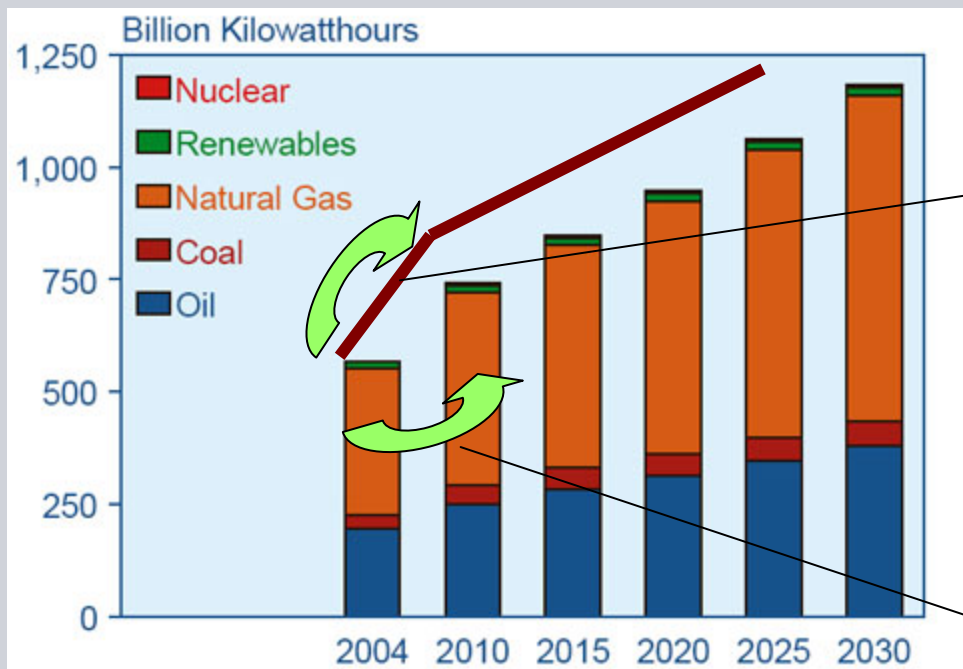
How green are our buildings?

When does the modernization payback?

Can we minimize our upgrading risk?

Buildings represent >40% of worldwide electricity/ oil consumption

The Middle East region (Saudi Arabia and Arab Gulf states) enjoys business growth, though face a bottle neck in power generation



GDP, power consumption:

+50% growth

Power generation:

+30% growth

Widening gap means:

- Electricity bill gets more and more expensive
- Industrial sites may even face planned/ forced shut down/ black-outs

Energy saving means:

- Direct profit/ EBIT benefits
- Business process smoothness

Sources: EIA, 2007; Global insight 2007

EUROPE: Siemens wins first GreenBuilding Endorser Award

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- European Commission commended Building Technologies for outstanding achievements in support of the GreenBuilding Program.
- The award pays tribute to the company for furnishing expert and committed support to a large number of customers in implementing improvements to the energy efficiency of their buildings.
- GreenBuilding is a voluntary program brought into being at beginning of 2005.
- Its goal is improving the exploitation of potential energy savings in business through information and motivation.

US: Hundreds of Siemens' customers accredited according to LEED standard

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Example for LEED platinum certified, 60% energy savings yielded

Sierra Nevada College (USA)

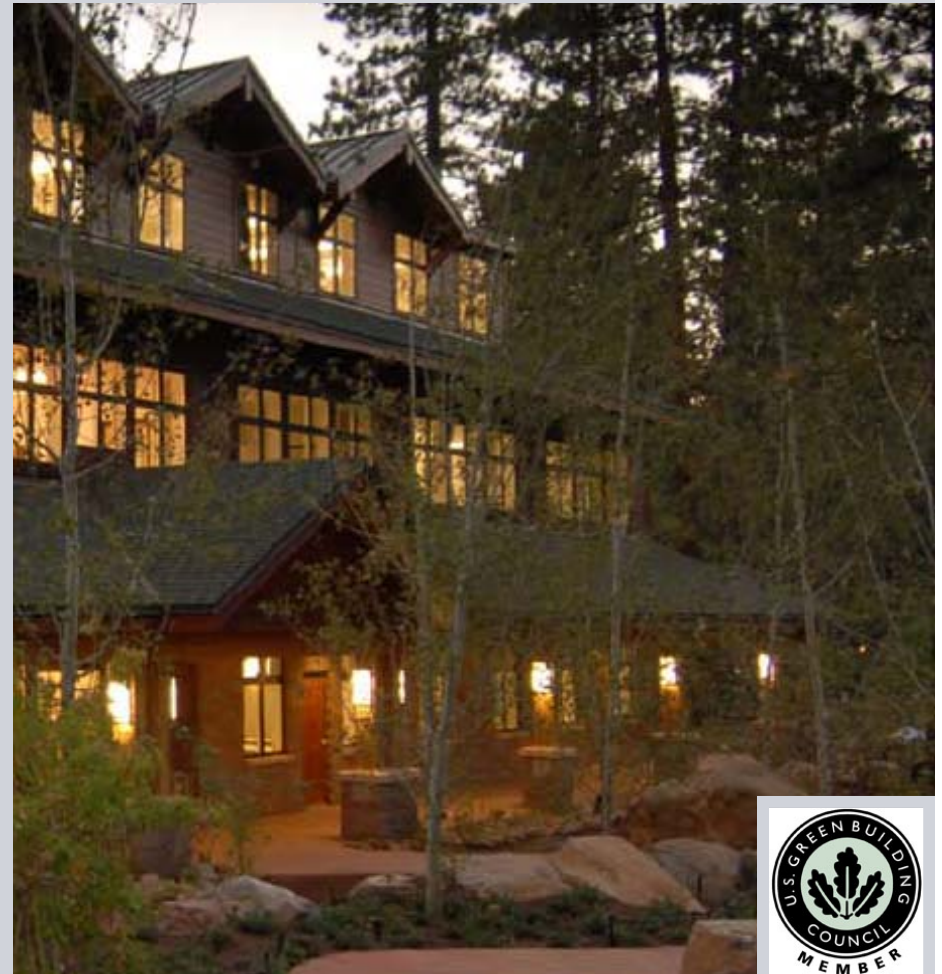
- Research and public education center
- 5,000 m²

Siemens Solutions

- Monitoring and control of:
 - Indoor air quality
 - Rainwater filtration system
 - Solar domestic hot-water system
 - Cogeneration heat recovery
 - Thermal storage
- High-accuracy sensors
- Chilled water production

Achievements

- LEED Platinum building including a LEED Platinum laboratory
- 60% energy savings over ASHRAE 90.1
- 65% water savings over traditional automation systems
- 7% higher upfront cost pay back in 15 years



Energy at the top of the agenda (1)



Where to invest for energy efficient buildings? Building Technologies

example:

commercial building,
15 years old
air-conditioning and cooling

saving potential (typical payback time)

35% → building envelop (> 25 years)

20% → Lighting, incl control (2-7 years)

10% → energy distribution (3-15 years)

20% → heating & cooling (5-10 years)
generating

15% → HVAC dimensioning (1-5 years)

primary energy

SBT scope of work

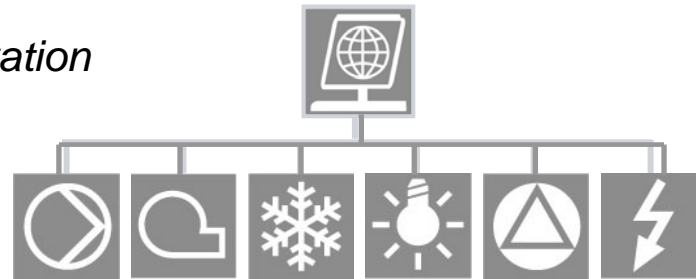
Energy at the top of the agenda (2)

Where to invest for energy efficient buildings? Building Technologies

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Contribution of up to **32**
out of **73 LEED pts.**

- *Management level optimization*
- *Smart room automation*



Siemens Building Technologies offers

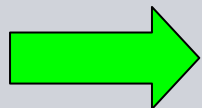
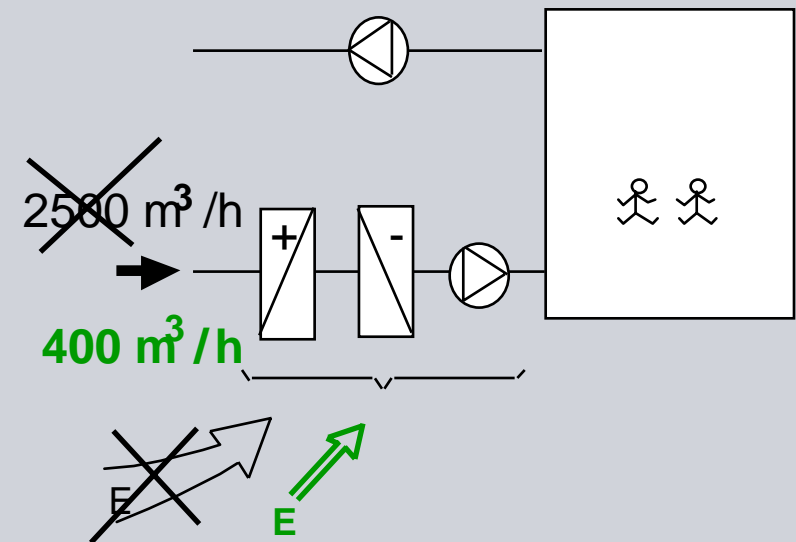
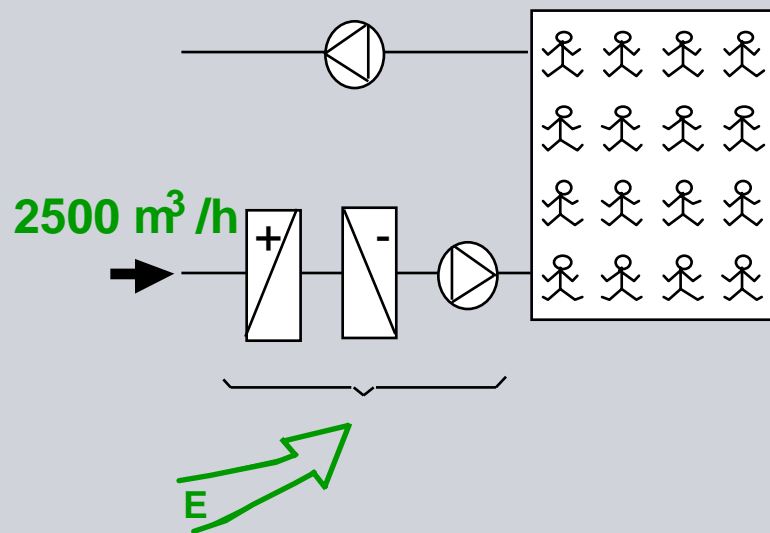
- Building Automation and Control System (BACS)
- Room management: temperature, blinds, lighting
- Technical consulting, solution design, engineering, installation, commissioning

Related saving measures

- *Optimized load/ demand management* throughout building infrastructure
- *Smart performance* at room-individual level (high precision thermostats, presence detector, air quality sensors, ...)
- UAE Green Building Council member

How to achieve good air quality & save: Demand-controlled ventilation

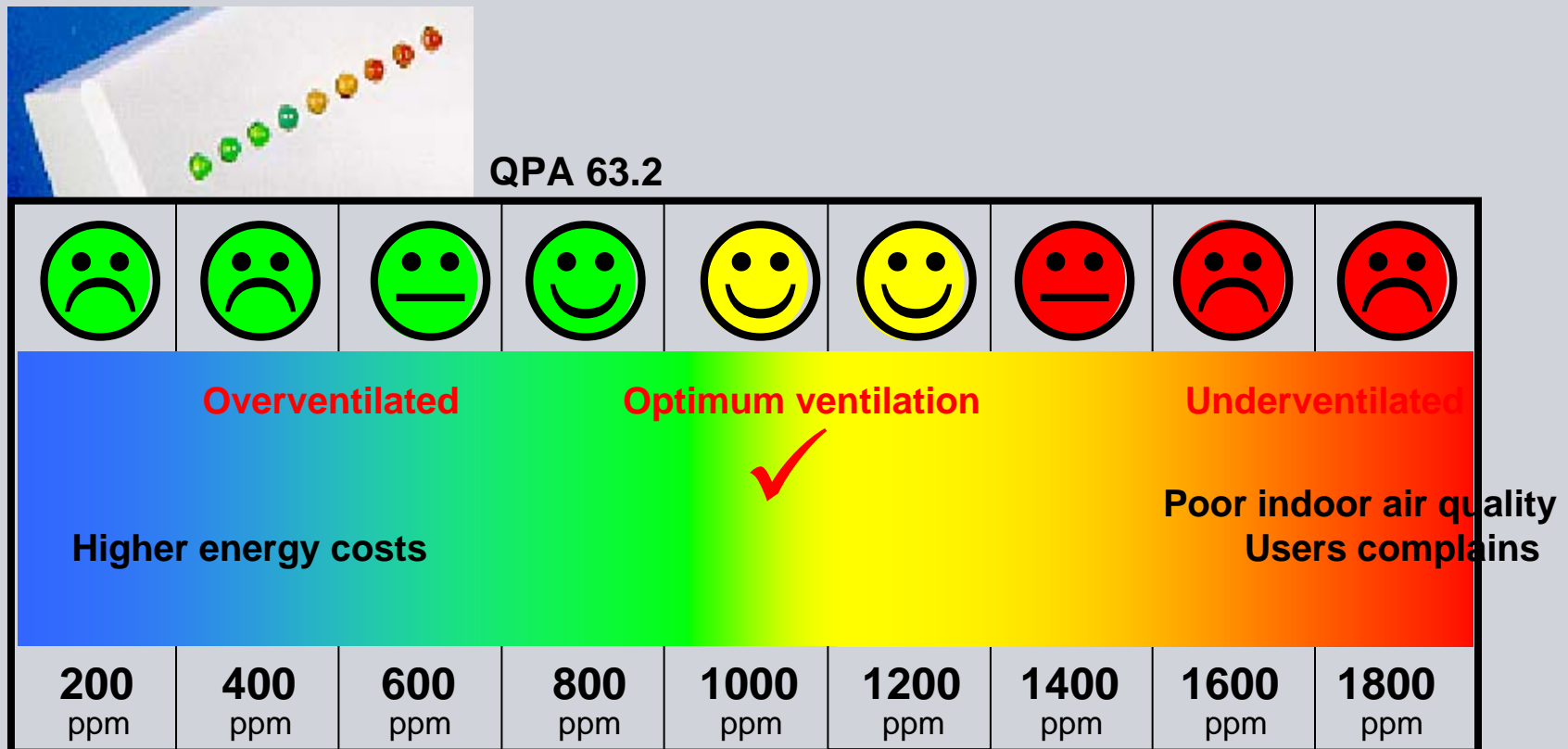
DIN and other standards (SIA) require an outside air flow rate designed for maximum occupancy.



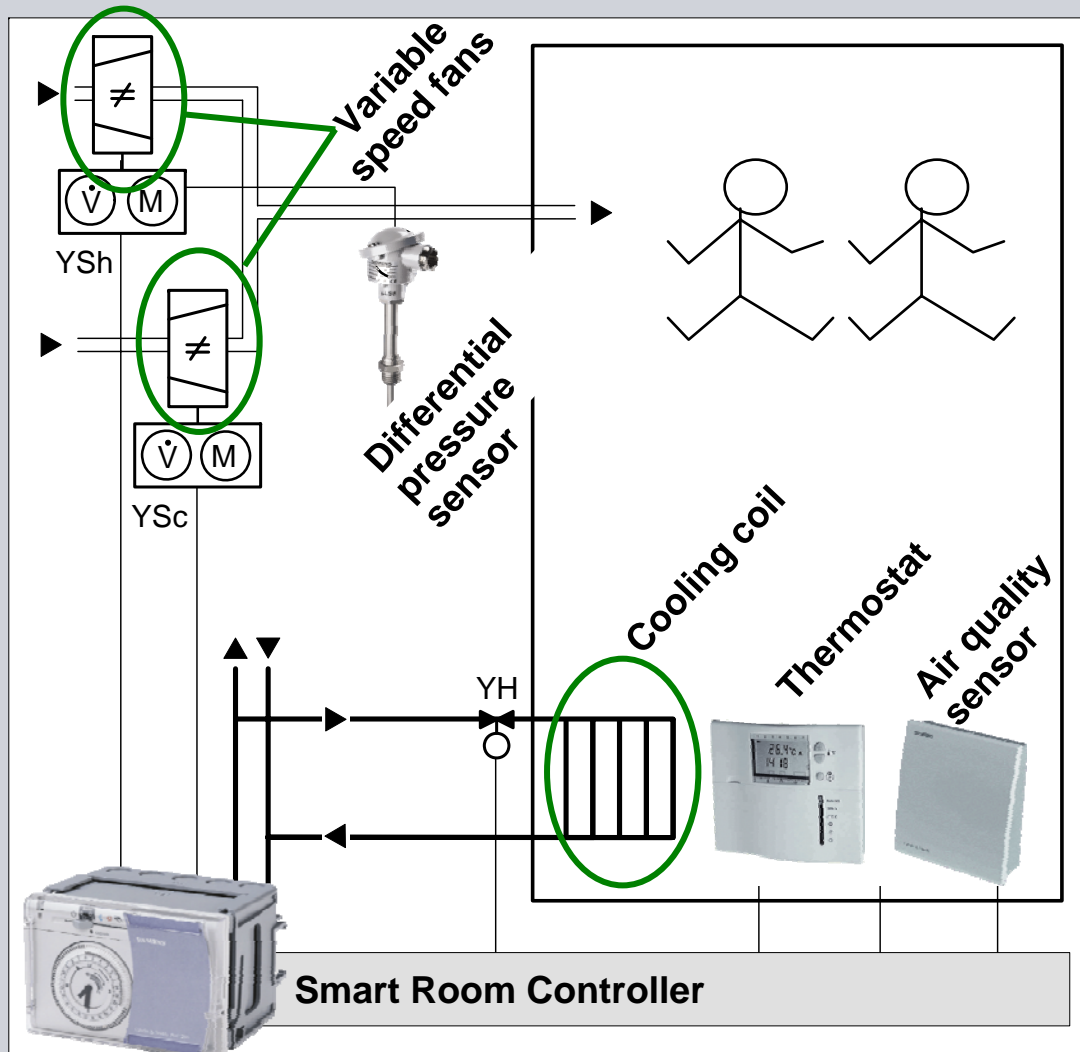
To make rational use of energy, the outside air flow rate must be reduced when the space is only partially occupied.

Demand-controlled ventilation is based on air quality/ CO2-measurement

CO2-scale as basis for a control loop



Smart room control: Key elements/ schematic control-loop



Intelligent automation and smart room control*: Answers to your specific energy saving needs



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Room Category	Thermal energy benefits				Electrical energy benefits			
	D	C	B	A	D	C	B	A
Offices	+51%	0	-20%	-30%	+10%	0	- 7%	-13%
Auditorium	+24%	0	-25%	-50%	+ 6%	0	- 6%	-11%
School/ University	+20%	0	-12%	-20%	+ 7%	0	- 7%	-14%
Hospital	+31%	0	-9%	-14%	+ 5%	0	- 2%	-4%
Hotels	+31%	0	-15%	-32%	+ 7%	0	- 5%	-10%
Restaurants	+23%	0	-23%	-32%	+ 4%	0	- 4%	- 8%
Warehouses, shops	+56%	0	-27%	-40%	+ 8%	0	- 5%	- 9%
Residential	+10%	0	-12%	-19%	+ 8%	0	- 7%	- 8%

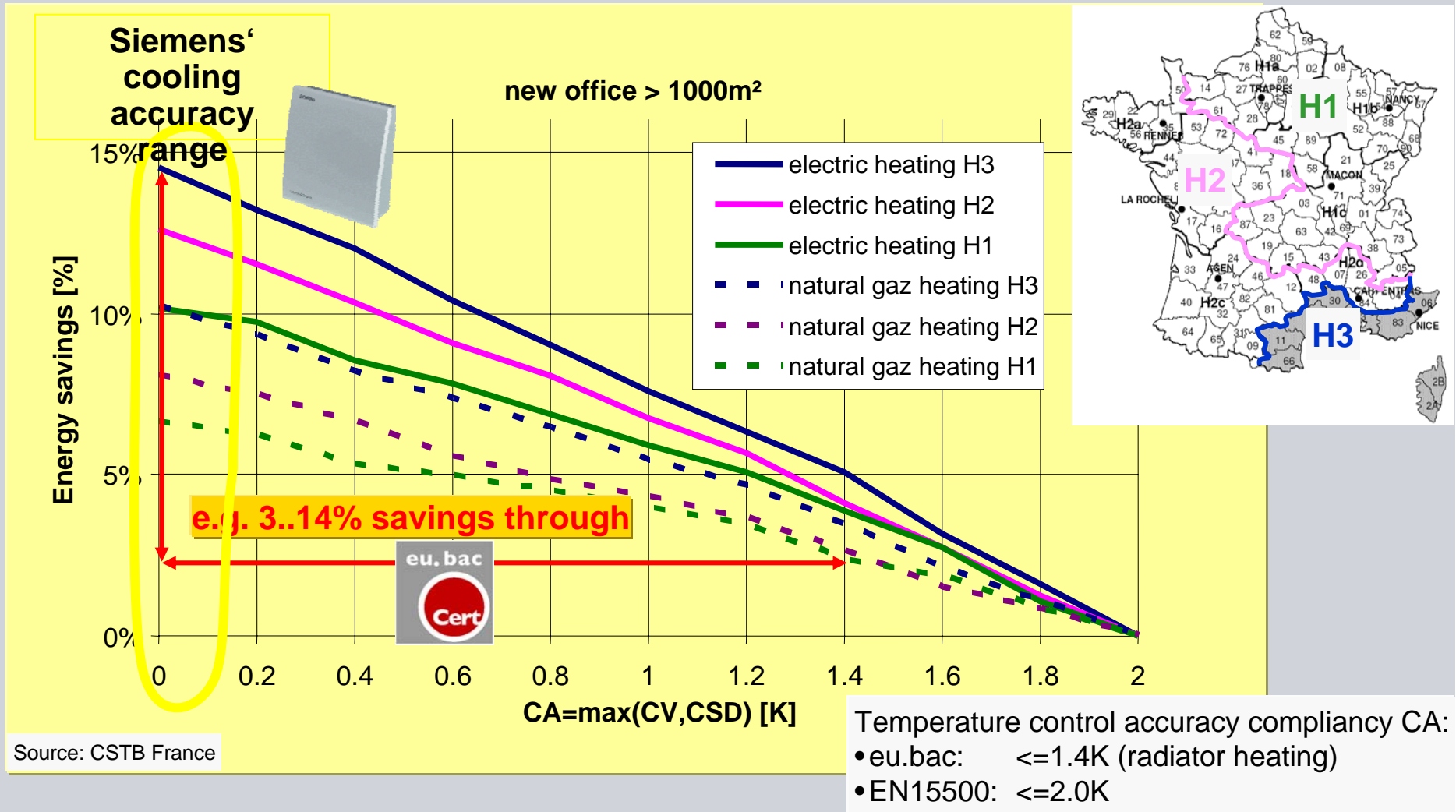
D = No or only centrally controlled automation

C = Automated, but stand-alone room control with thermostat/ external temperature monitored for cooling control

B = Room control with communication to overall building automation system

A = Need based room control, fully integrated into BMS (i.e. including temperature & air quality sensors, presence detector,)

The additional benefits of Siemens' high quality products/ high precision sensors



Source: CSTB France

The Symaro Air quality sensor

The life expectancy

The products offer a very long service life.

In compliance with the standards

The products comply with all relevant standards and guidelines.

Mounting and commissioning

Straightforward and quick.

The technology

Leading edge sensor technology.

The design

Ergonomic and elegant.

The compatibility

Full compatibility with a large number of Siemens controllers with an extensive choice of tested applications.

The high accuracy

Precise acquisition of measured values in all applications and mounting situations, thanks to functional design and digital technology.



QPA2000

Compatibility and continuity

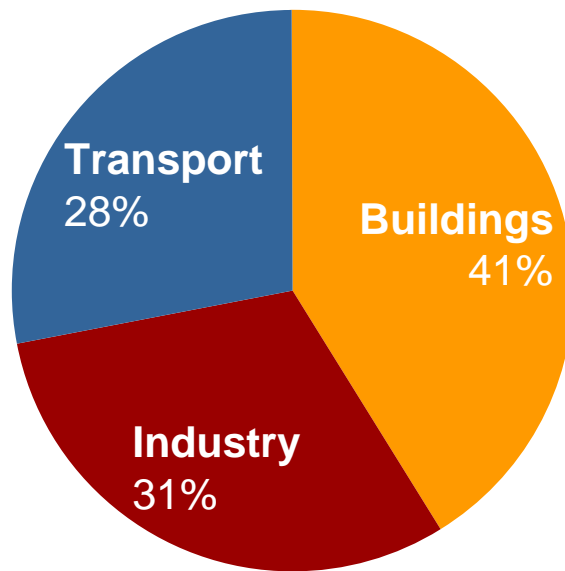
Both ensure protection of your investments.

Environmental impact of smart room control: Buildings are the biggest lever for saving CO2

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Primary energy use in Sectors



Impact of Building Automation

Efficiency improvement and modernization can save up to 30 percent

- **Dependency**

Without provisions, dependency on external energy will rise to 70%

- **Environment**

Energy production and consumption create 94% of CO₂ emissions

- **Supply**

Influence on energy supply is limited

- **Cost**

Substantial increase within a few years

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It pays to go easy
on the environment

Energy & Environmental Solutions

Thank
you

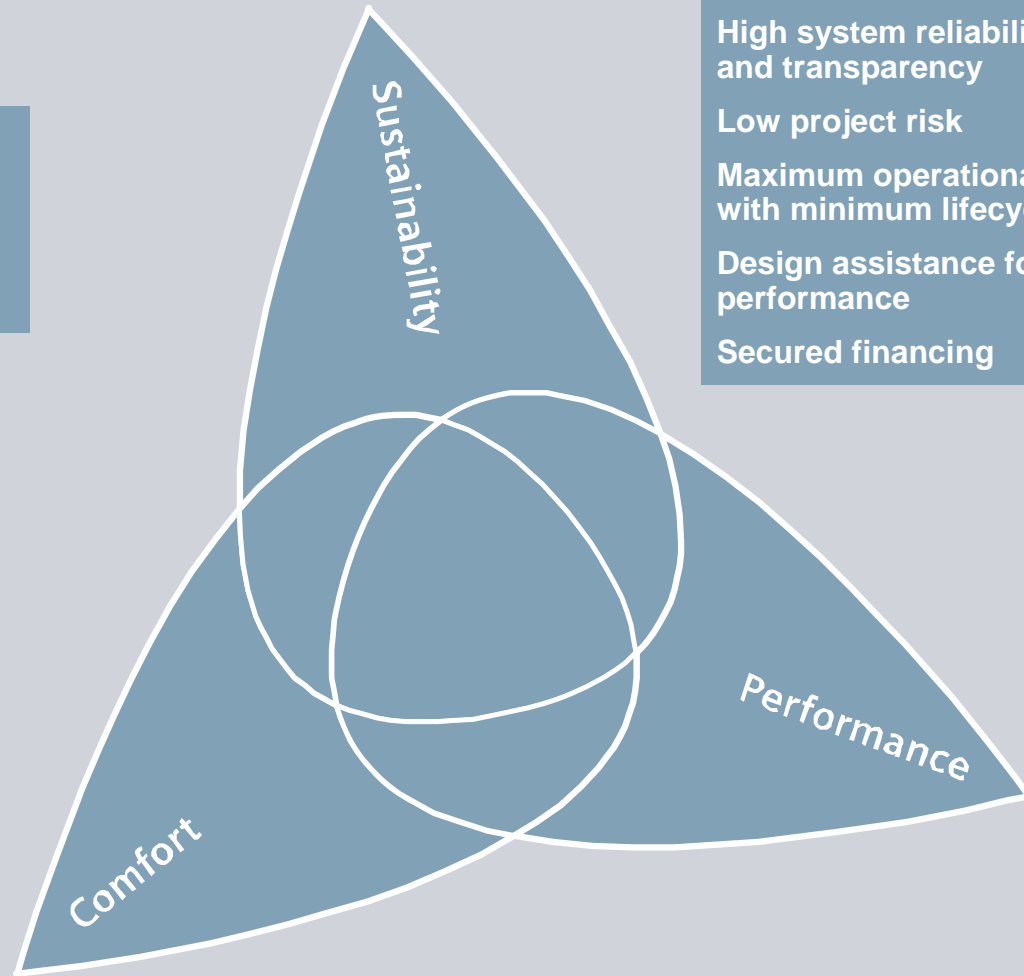


Customer Needs Comfort, Sustainability, Performance

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Environmentally friendly buildings
“Green” energy sources
Green house gas reduction
Total transparency of energy flows

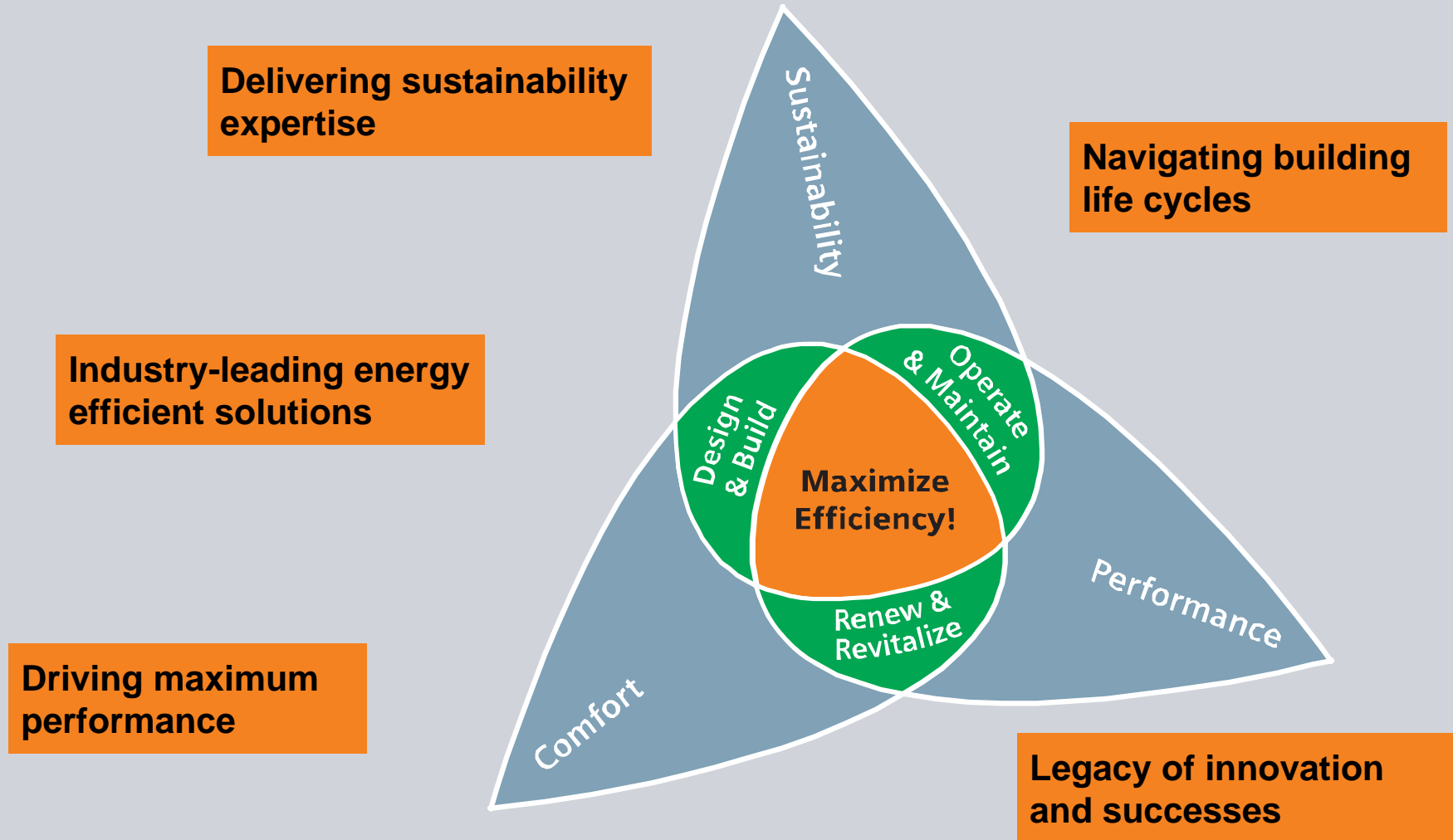
Healthy, motivated and
productive staff
Relaxed guests and customers
Design assistance for optimal
comfort and safety



High system reliability
and transparency
Low project risk
Maximum operational efficiency
with minimum lifecycle cost
Design assistance for building
performance
Secured financing

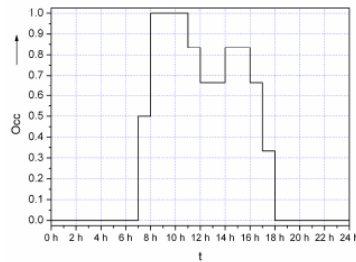
Siemens' impact
Comfort, Sustainability, Performance

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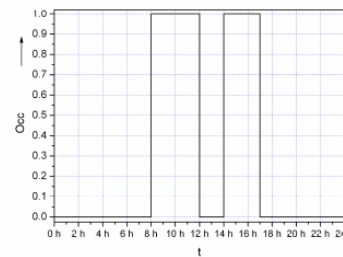


Building automation efficiency for different application profiles – EN 15232

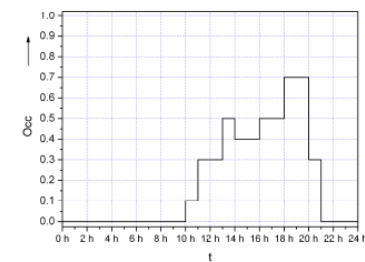
Office



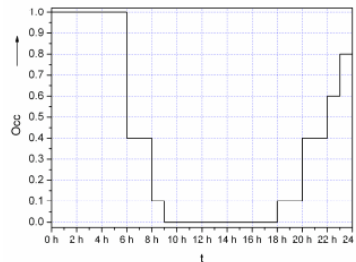
School



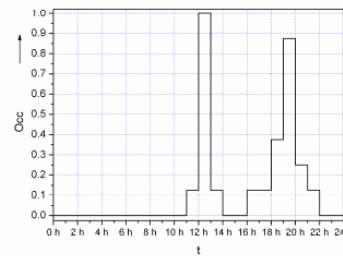
Warehouse



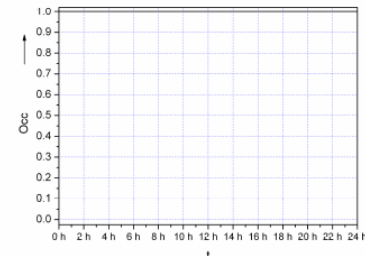
Hotel



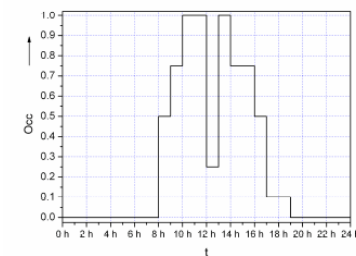
Restaurant



Hospital



Presentation aula



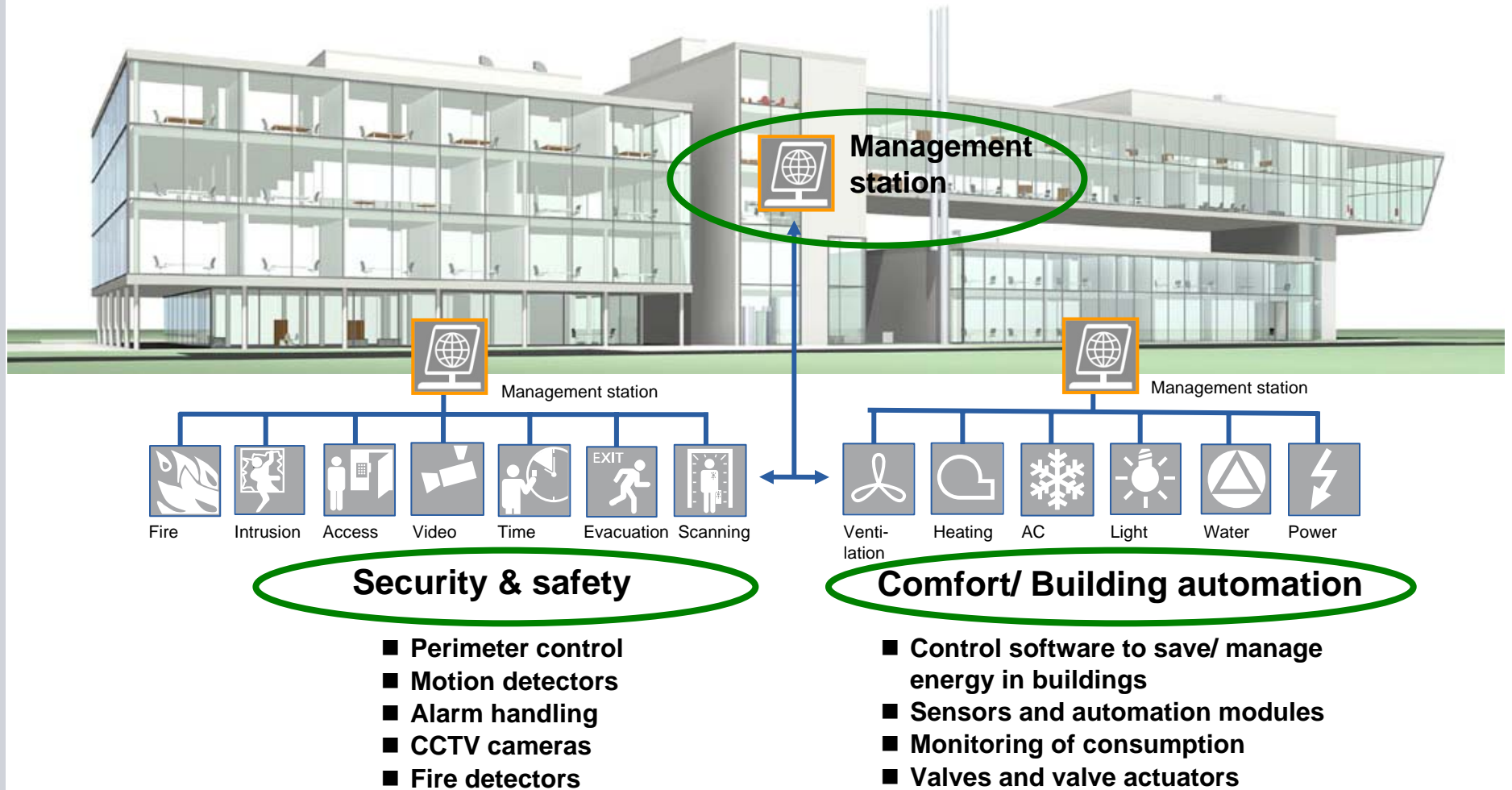
Load profiles according to EN 15217

Customer Needs

	Comfort	Sustainability	Performance
Investor Sells building after construction	<ul style="list-style-type: none"> ▪ Occupant acceptance 	<ul style="list-style-type: none"> ▪ Occupant acceptance 	<ul style="list-style-type: none"> ▪ Low project cost ▪ Low project risk ▪ Occupant acceptance
Planning office/ consultant	<ul style="list-style-type: none"> ▪ Investor acceptance ▪ Planning support for comfort 	<ul style="list-style-type: none"> ▪ Investor acceptance ▪ Planning support for green buildings 	<ul style="list-style-type: none"> ▪ Investor acceptance ▪ Planning support for building performance
General contractor	<ul style="list-style-type: none"> ▪ Investor acceptance 	<ul style="list-style-type: none"> ▪ Investor acceptance 	<ul style="list-style-type: none"> ▪ Low project cost ▪ Low project risk
Owner Builds and uses building Typical for: public, pharma, healthcare, airports etc.	<ul style="list-style-type: none"> ▪ Health, wellbeing, motivation and productivity of staff, guests and customers 	<ul style="list-style-type: none"> ▪ Green building ▪ Reduction of CO2 and environmental impact ▪ Use of alternative Energy ▪ Energy transparency 	<ul style="list-style-type: none"> ▪ Low lifecycle costs ▪ Low project risks ▪ System reliability ▪ Effective event/ alarm management
Building occupant	<ul style="list-style-type: none"> ▪ Health, wellbeing, motivation and productivity of staff, guests and customers 	<ul style="list-style-type: none"> ▪ Reduction of CO2 and environmental impact ▪ Use of alternative Energy ▪ Energy transparency 	<ul style="list-style-type: none"> ▪ Low operating costs ▪ System reliability
Building operator	Occupant satisfaction	<ul style="list-style-type: none"> ▪ Reduction of CO2 and environmental impact ▪ Energy Transparency 	<ul style="list-style-type: none"> ▪ Effective event/ alarm management

Siemens Building Technologies: Comprehensive solutions and integration

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Building comfort, air-conditioning and ventilation control

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Valves and actuators:

Air and water flows in the buildings are controlled through our powerful control mechanisms



Damper actuators:

Manage the airflow and the energy consumption in the buildings to an optimum level



Sensors:

High precision humidity, temperature, air quality sensing



Controllers:

Integrate, manage and save the energy load in an efficient way

