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ISCN-GULF Conference 2009

Sustainable Campus Infrastructure

Ways into a CO-2-free Future

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What is this presentation about

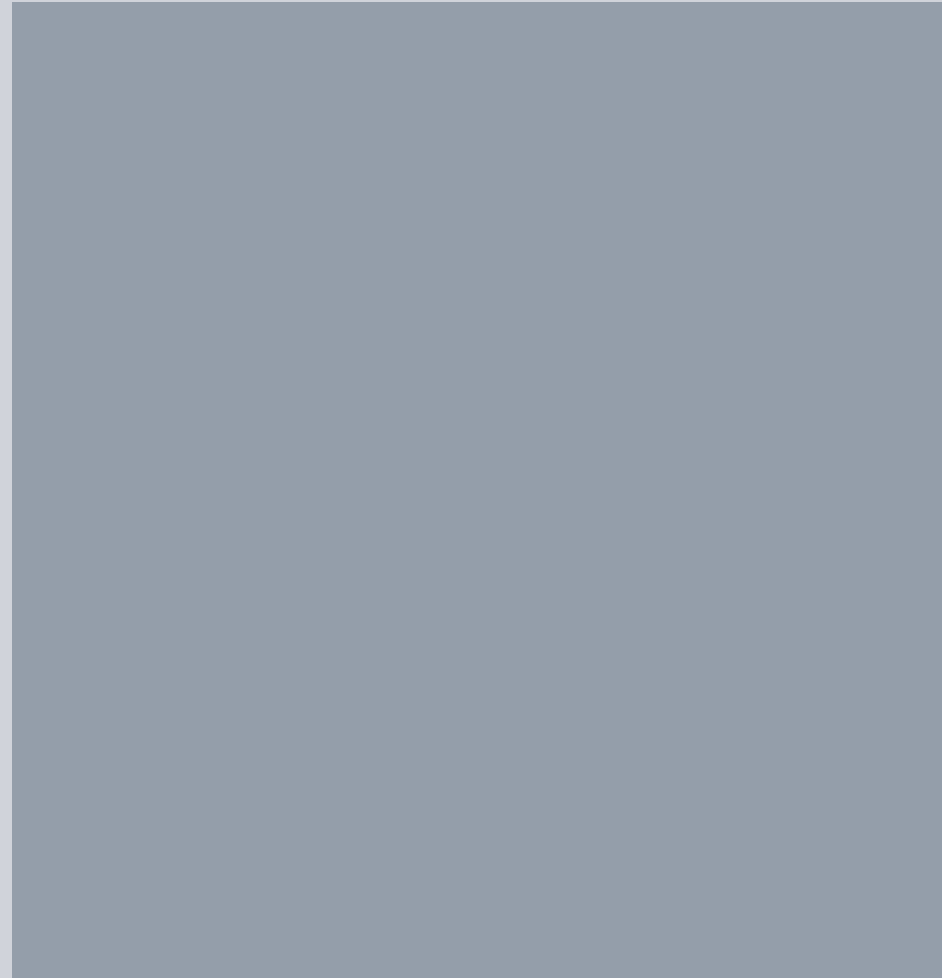


- What is possible
- What does this mean for University Campuses
- Case study – what does the customer had been faced with
- How did the customer managed the situation
- Conclusion
- References
- Siemens Background



What is possible

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Just a short wrap up



Energy is a vital resource for your organization.

Security, reliability and cost have an impact on **your business results and performance.**

Any decrease in energy consumption translates into a reduction in greenhouse gas emissions, and a **positive environmental impact.**

High performance buildings make for high performance business. **Energy is the lifeline of your facility**

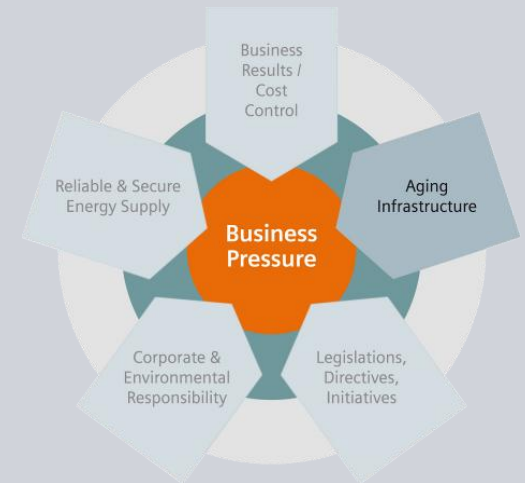
– the pulse of your business.

Aging facilities and old heating/cooling equipment to operate and maintain

Technical systems and equipment such as boilers, chillers, motors, pumps and lights used in buildings account for approximately

40 percent of the world's energy consumption.

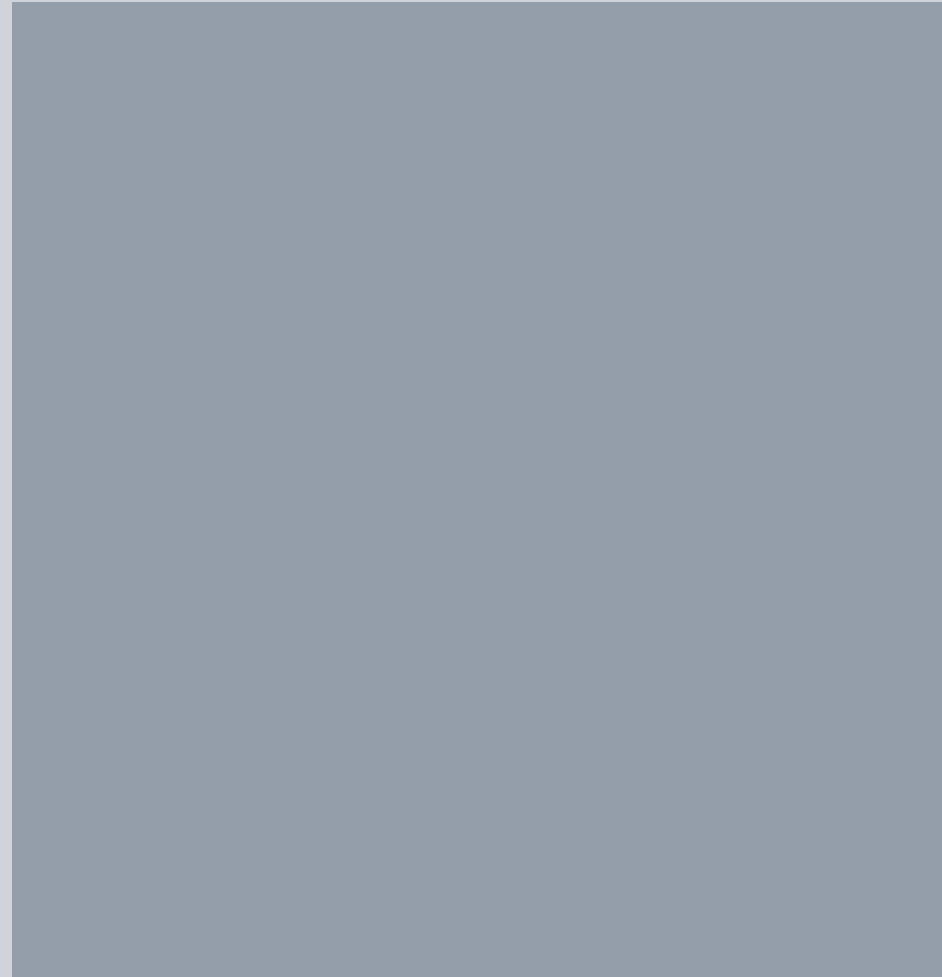
All this is to maintain a healthy, productive and comfortable working environment for the building occupants



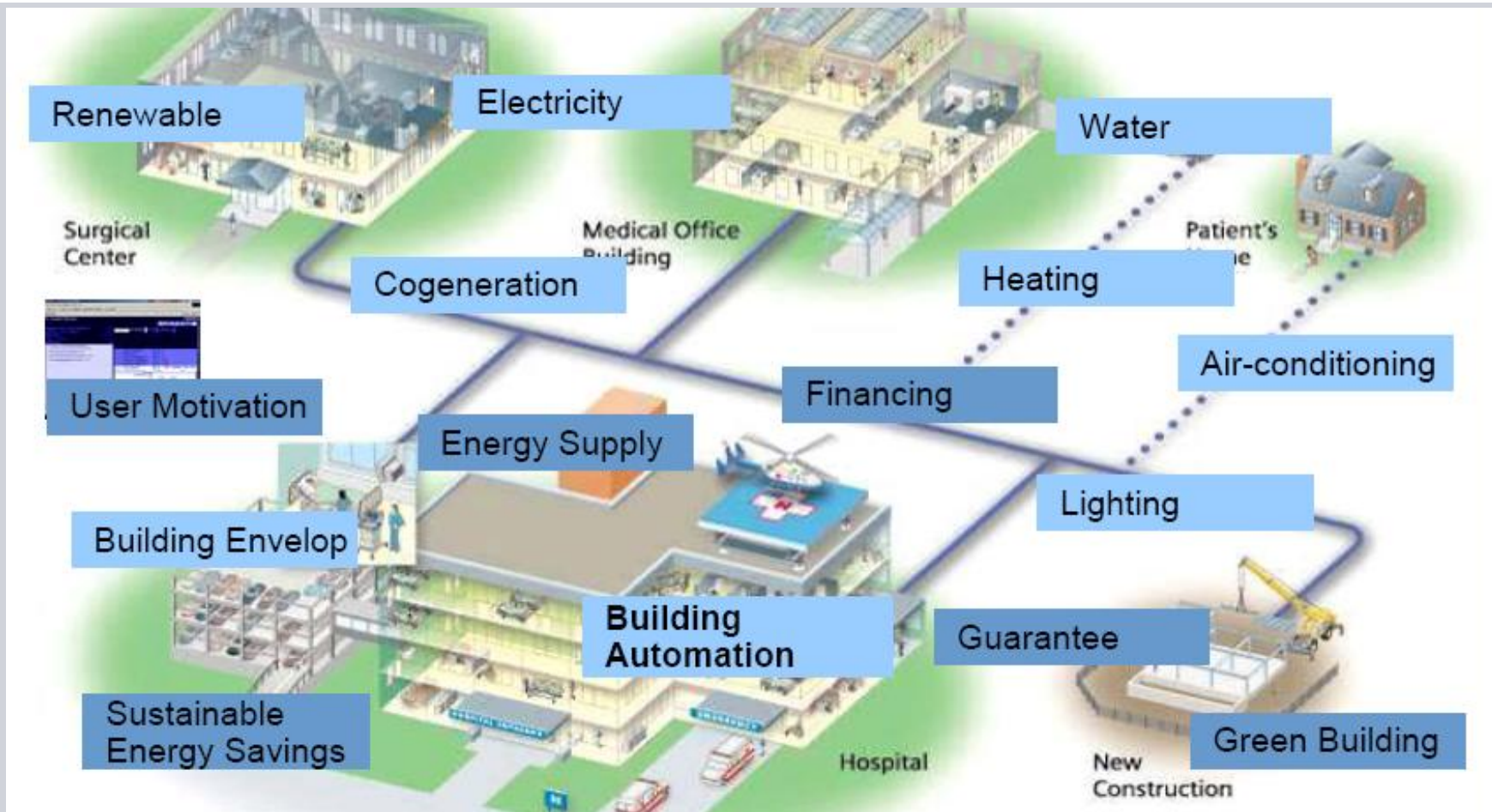


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What does that mean for the university campus

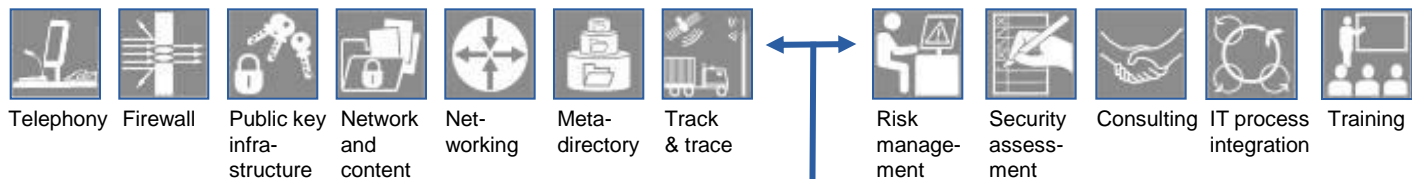


The ambitious objectives to reduce the CO₂-production are already addressable with today's technology



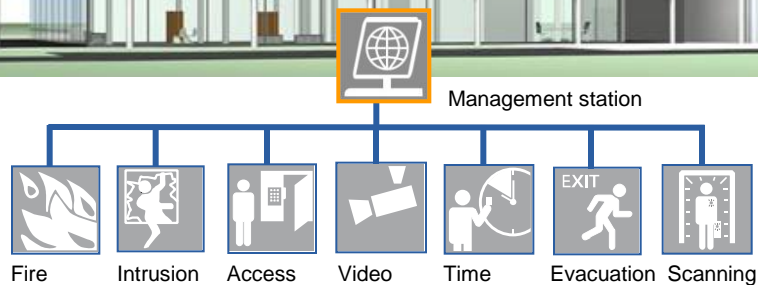
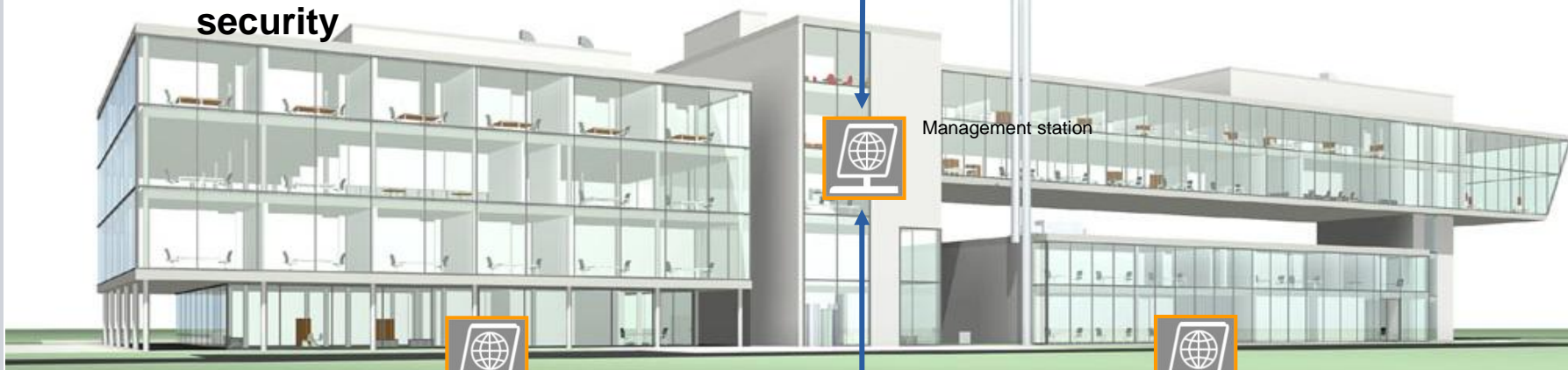
Based on IPCC-world climate report 2007 the task has been formulated to reduce greenhouse gas emission until mid of the century by more than 50%

What it takes to be leader in Total Building Systems (TBS)

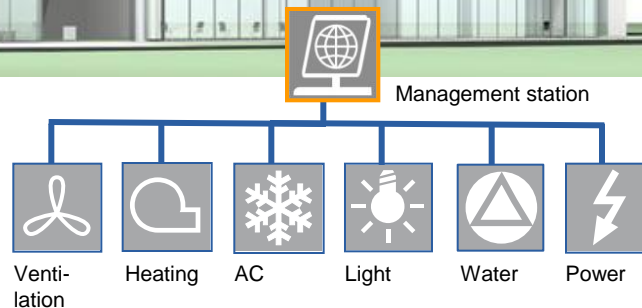


Communications and IT security

IT process integration

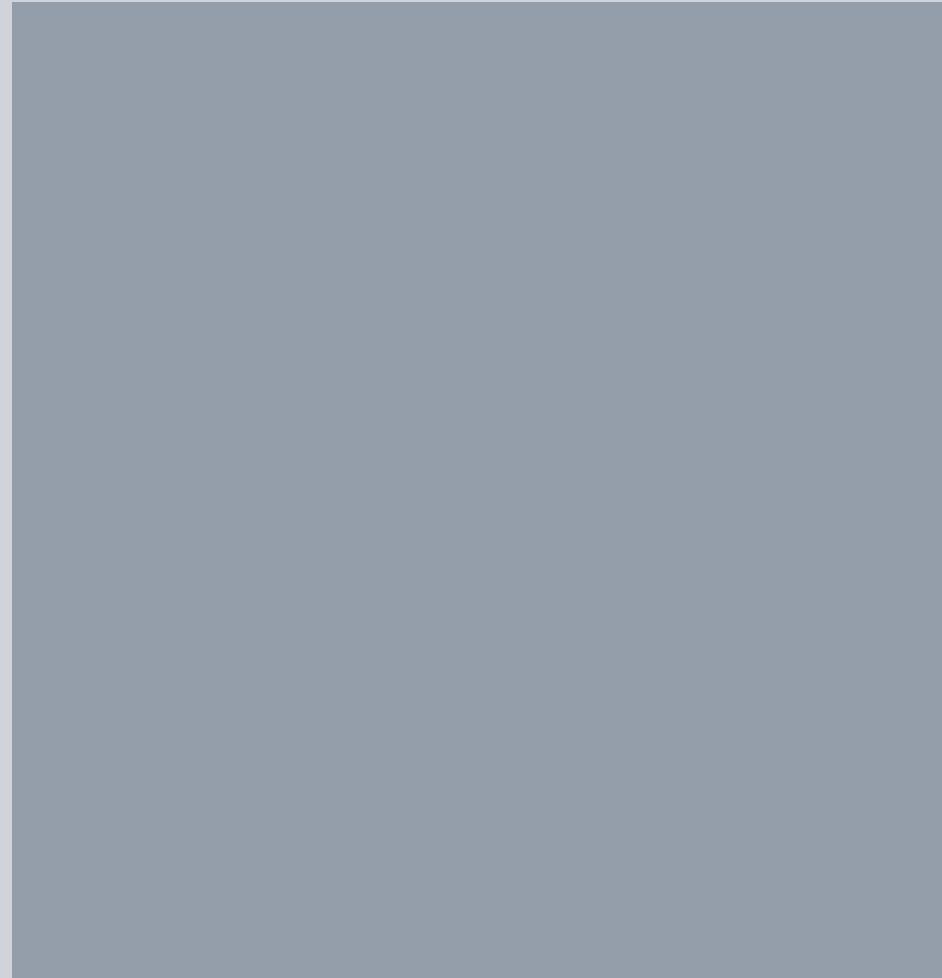


Security & safety



Building automation

Case study - what challenges the customer had been faced with?



Case study - what challenges the customer had been faced with?

Regulations

- In administration driven organizations savings have been paid to the superior authority
- Universities are users of the buildings but not owners
- The county is owner of the buildings but not the user
- In some cases neither the user nor the owner is operation the properties

Organization

- Talking about management decisions means integrating different departments like property management, security, IT/IC datacenters
- Change into a green strategy means change the behavior of the people

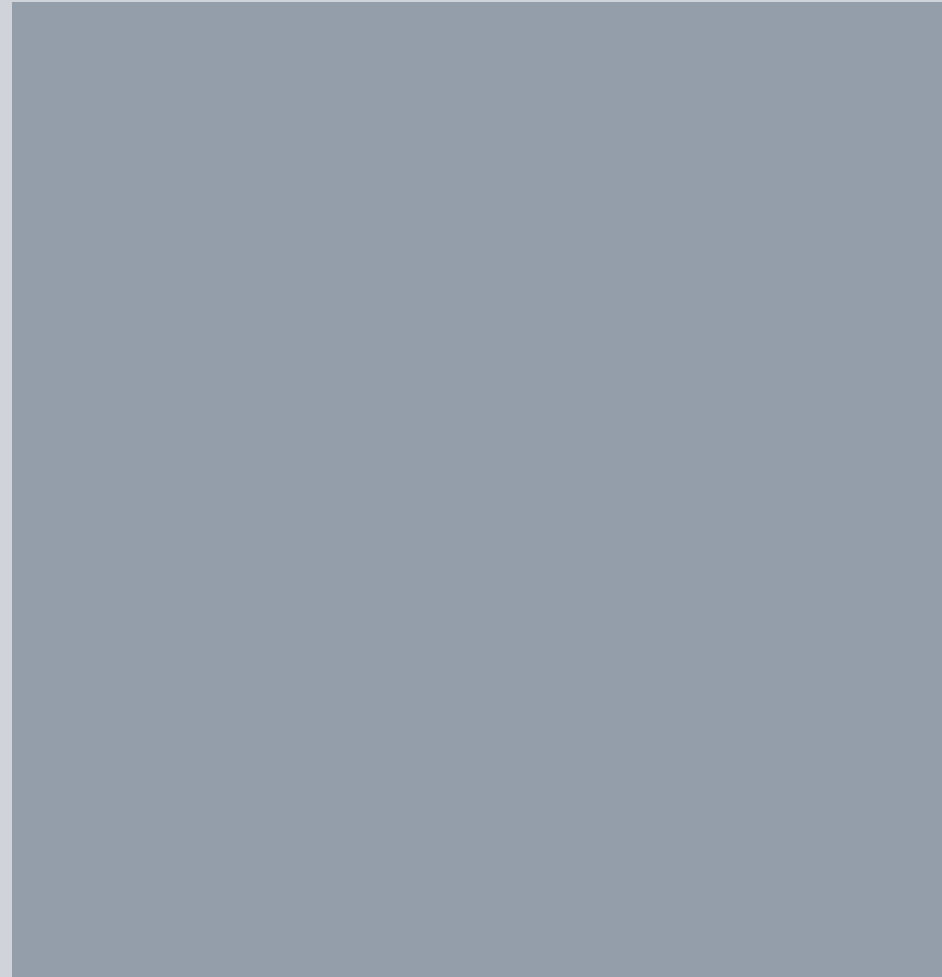
Technique

- The products have technically work together
- The investment in the cheapest is not the cheapest investment – focus moves to life cycle consideration

Financing

- Liquidity vs. need of investment
- Cost savings
- Guarantees in earnings
- Leasing as a financing model

How did the customer managed the situation?



Case study - what challenges the customer had been faced with?

Regulations

- Integrate all relevant external parties involved from the very beginning and discuss about the challenge and not about pricedom

Organization

- Integrate all relevant internal departments of your own organization to start a discussion to make all parts of the solution

Technique

- Integrated all products across the whole range of technical media like heating, power and ventilation on a building lifecycle view

Financing

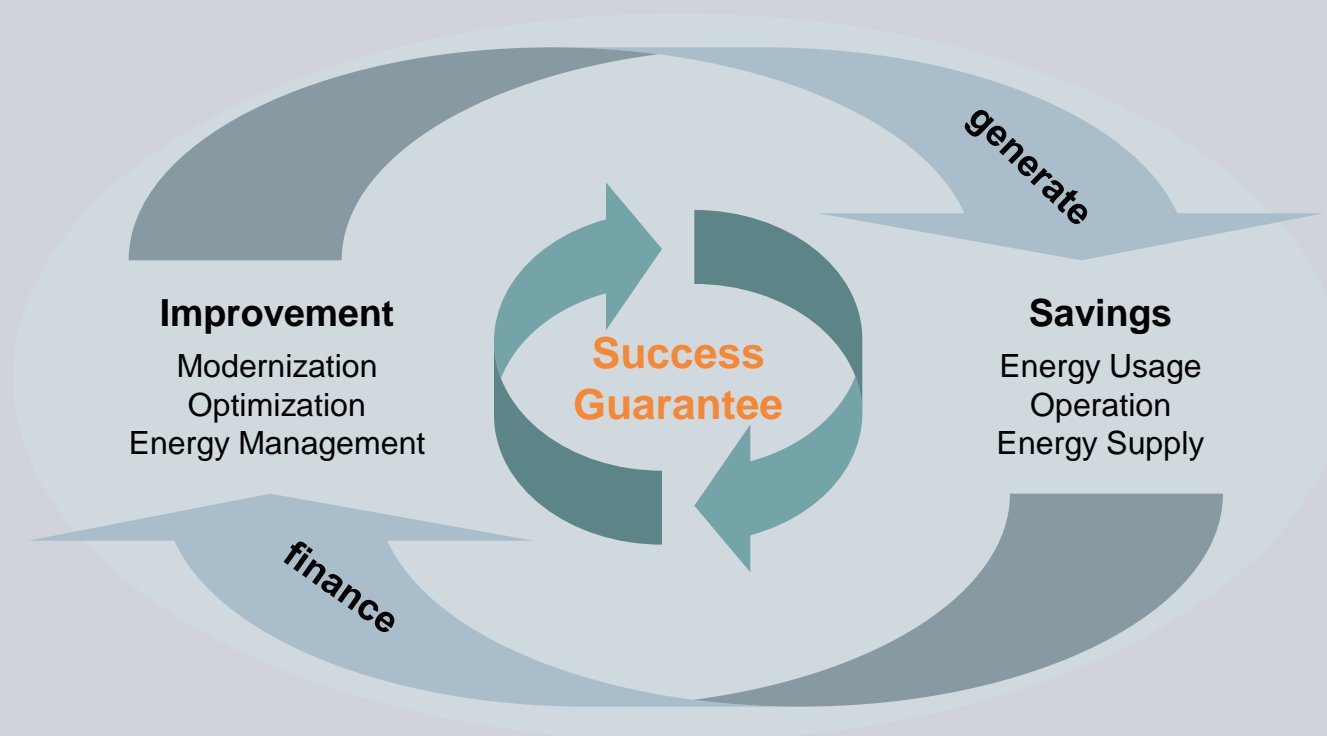
- Integrate all financial aspects based on a serious long term calculation with savings based on guarantees

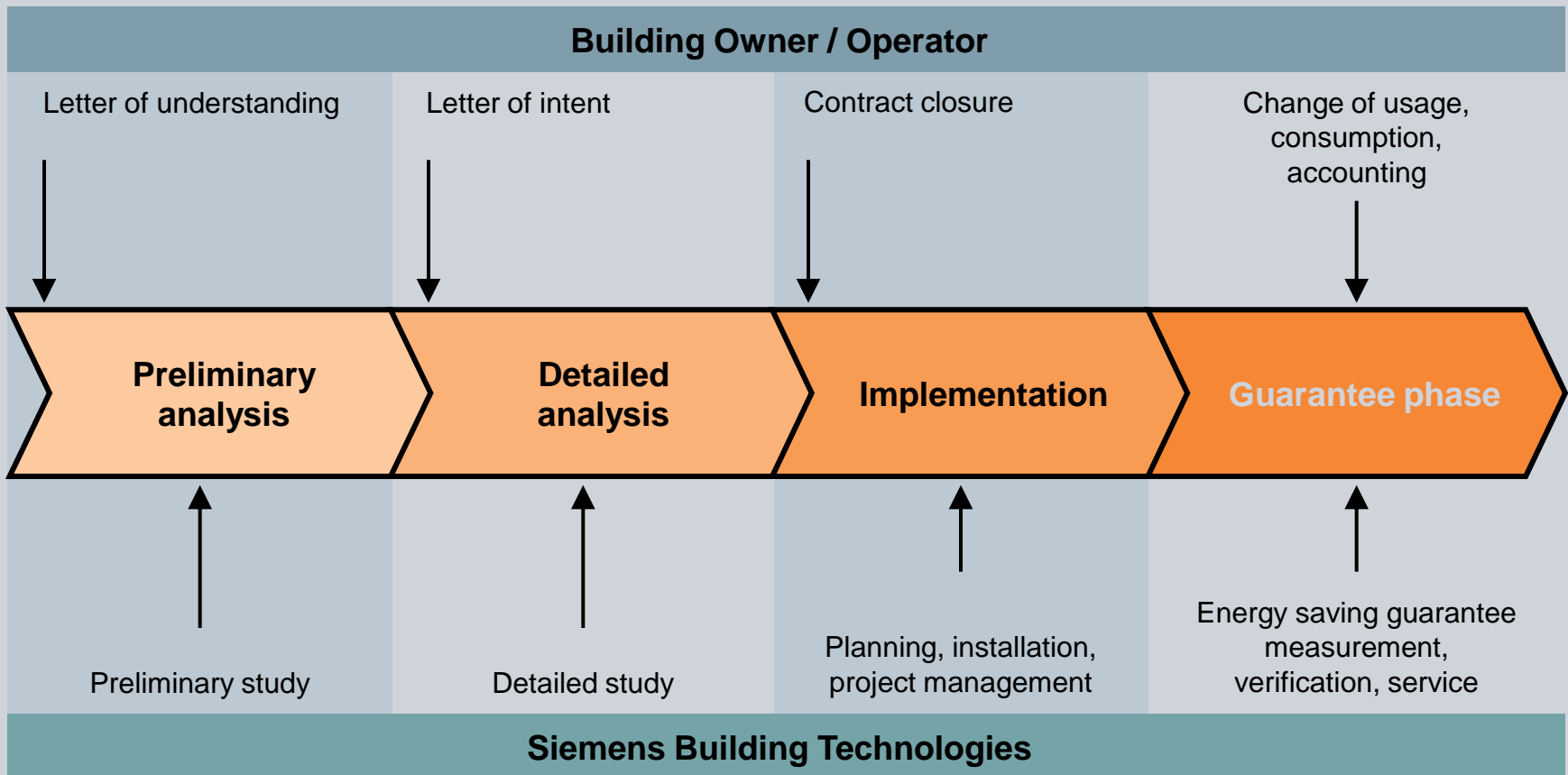


Energy & Environmental Solutions

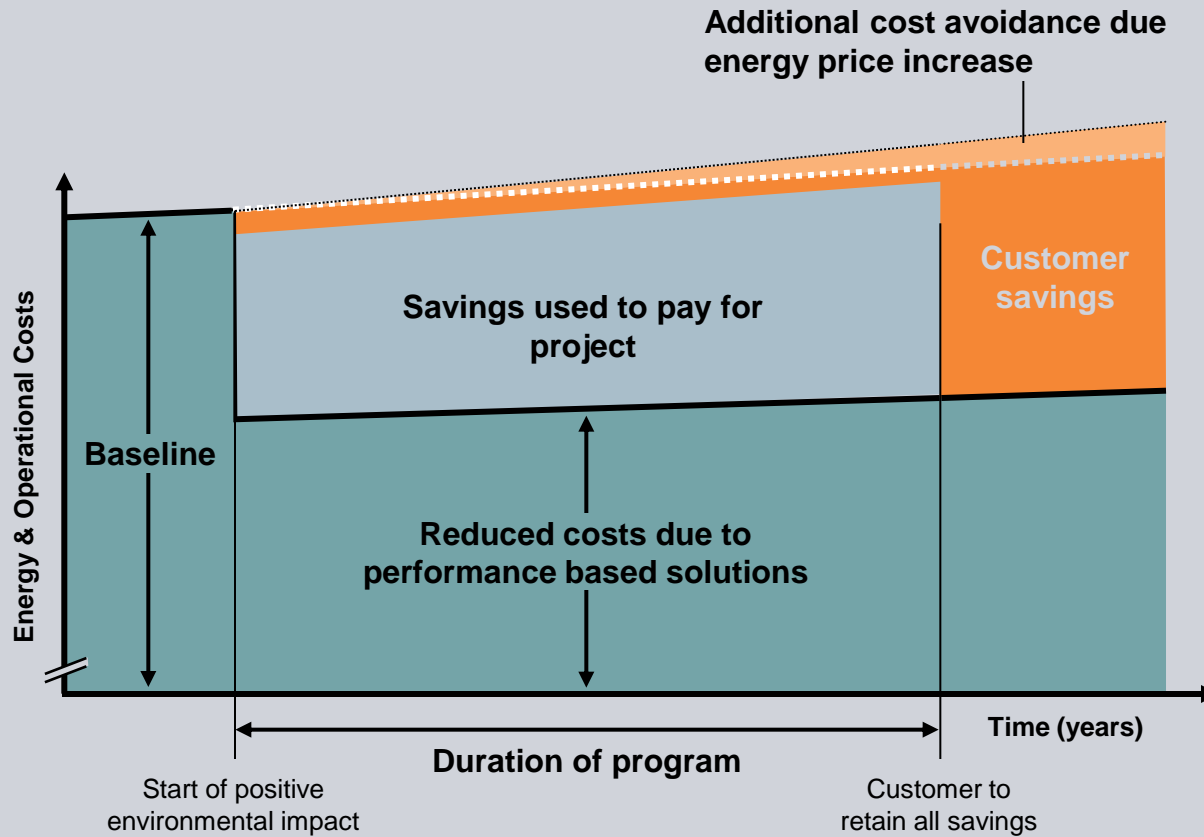
A winning formula!

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Energy & Environmental Solutions The Process





Building Automation Division

Offerings in all phases of the building's life-cycle



	Planning Phase	Construction Phase	Operating phase	Renovation / Modernization
Market offerings	<ul style="list-style-type: none"> Building automation systems Integrated solutions Specific applications for Vertical Markets Total Building Solutions (TBS) 		<ul style="list-style-type: none"> Maintenance services Operating services Energy management solutions Energy consulting Repair-exchange services 	<ul style="list-style-type: none"> Migration solutions Performance contracting
Our partners	<ul style="list-style-type: none"> Planners Specifying Consultants Real Estate Developers Building Owners 	<ul style="list-style-type: none"> General contractors Specialty contractors Installers VAP 	<ul style="list-style-type: none"> End-customers Building operators FMS Companies 	

CONTRACT SIGNED WITH BEGINNING OF THE YEAR



References

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Hong Kong Polytechnic University Fully integrated system

Features

- The University campus is located in Hung Hom, Kowloon, Hong Kong
- 15'000 students

Equipment installed

- control and monitoring system within campus
- Laboratory control system
- Apogee Building Automation System:
 - 15,000 data points - Mechanical Automation System
 - 1,000 data points - Electrical Automation System
 - 3,000 data points - Instabus Lighting Automation System



Reference project: Clinical Center Reinkenheide, Germany

"Our expectations were more than exceeded.", according to the very satisfied, Jürgen Breuer, technical director of the Bremerhaven Reinkenheide Clinic. "We not only receive modern plant technology in-house, but also save more than 4,100 tons of CO₂ for the environment."

Investment: € 6.3 Mio.

Service: € 3.5 Mio.

Guaranteed savings p.a.: € 0.9 Mio.

Lowering energy costs by 40.5%
compared to 2004 levels



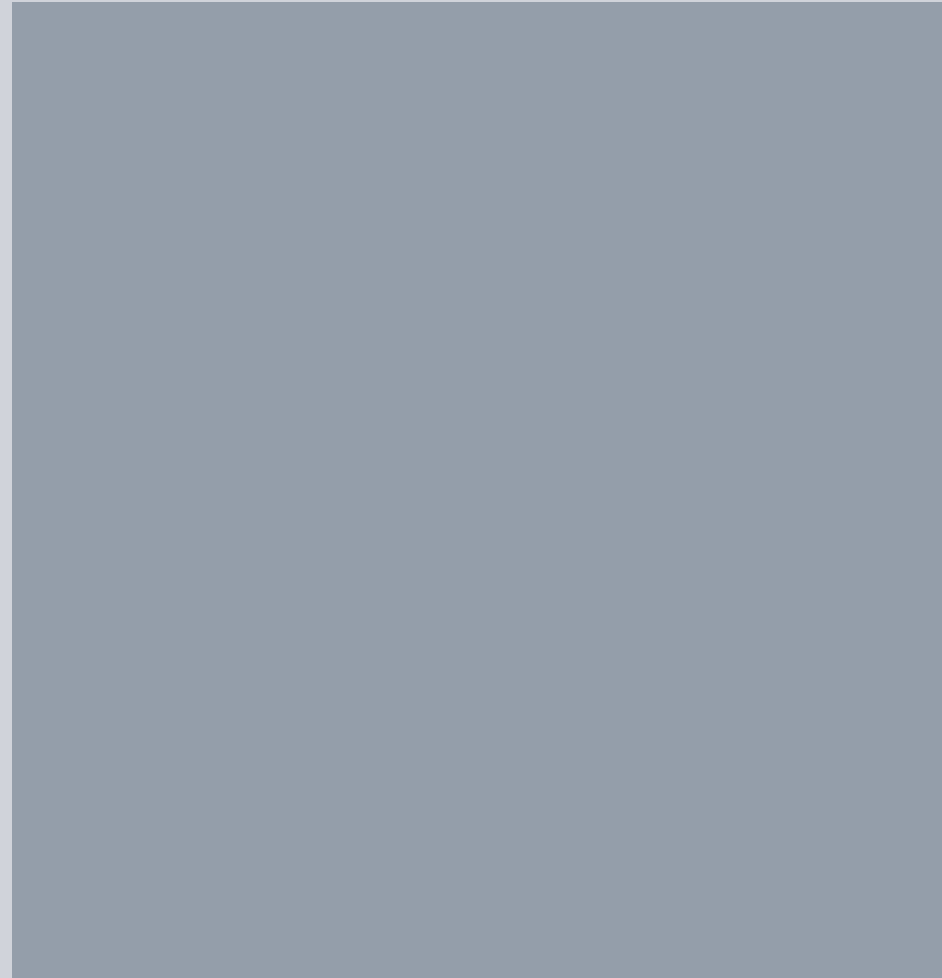
Mean Measures

- Cogeneration with Soja Oil
- MSR, RLT
- Cooling – Usage of the Co-gen
- Exchange Dish-Washing machine
- District Heating



Siemens Background

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Energy & Environmental Solutions: Achievements

- Over ~1'900 energy projects realized globally since 1994
- Total savings of ~1.5 billion EURO over a period of 10 years
- CO₂ savings from all energy projects: ~2.45 Mio. tones of CO₂ per year

2,45 Mio tones is equivalent to 805'000 cars each driving 20'000 kilometers per year!

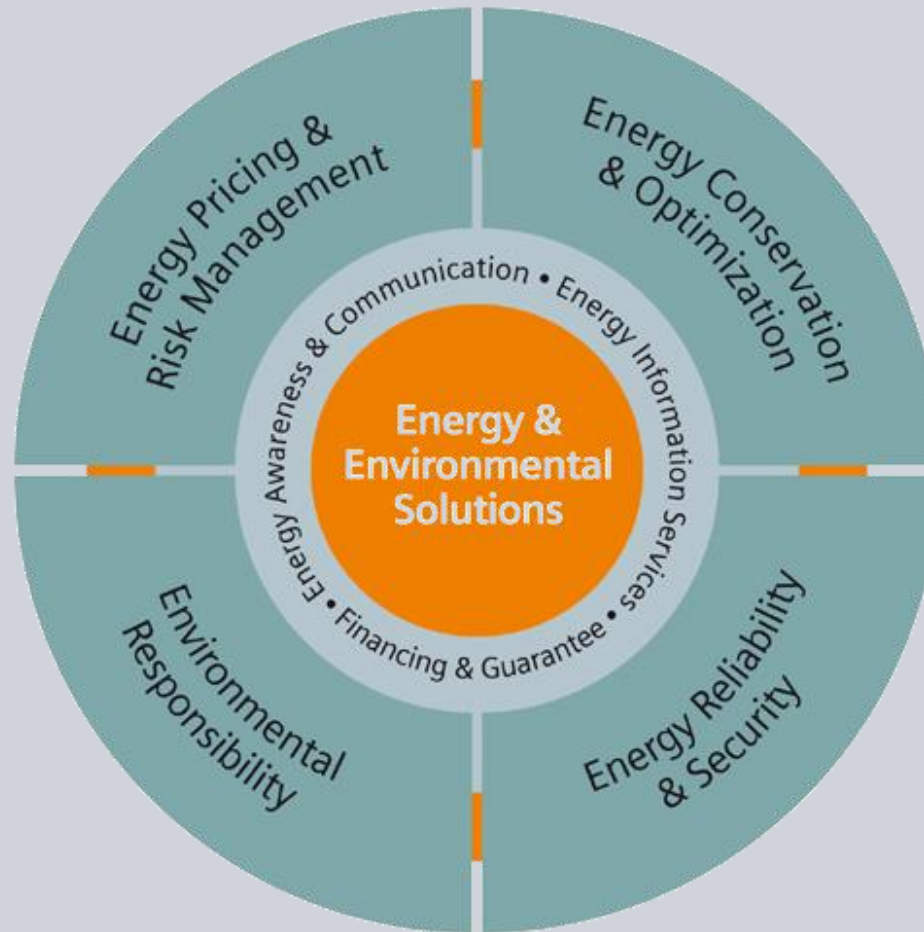


Energy & Environmental Solutions: An important Part of the Siemens history

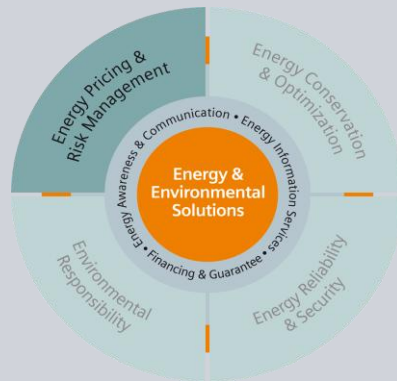
- Over 100 years of providing Energy Management Systems and Services
- Early energy innovator – Siemens holds over 6000 energy related patents
- We merge professional energy and environmental planning, consulting and commodity procurement with years of expertise in implementation and measurement of energy savings, facility improvement measures and infrastructure modernization.
- From conceptualization of a strategic master plan to implementation of facility improvement measures, as well as from energy procurement to small-scale power generation, Siemens has the answers.



Energy & Environmental Solutions



Energy pricing and risk management



- Evaluates and manages your organization's critical energy supply.
- helps procure energy competitively in liberalized or de-regulated markets
- helps your facilities utilize energy more efficiently.
- manage and stabilize your energy costs

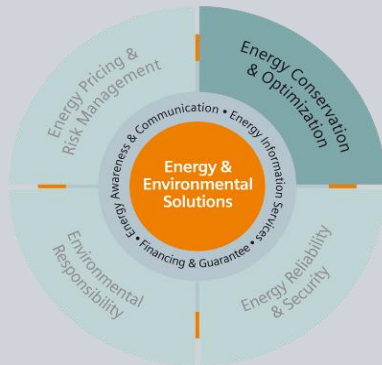
Glenbrook High School District 225



Project details

- 10-year, multi-phase performance contract
- Electric and gas procurement services
- Campus-wide building automation system (BAS)
- New chiller plants and extensive HVAC technologies
- Technical support program services (maintenance, training, reports)

Energy conservation and optimization



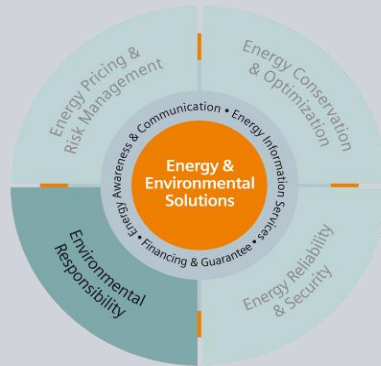
Chemnitz Clinic



Project details

- Energy efficiency in buildings is the **quickest**, most **cost-effective** and **environmentally friendly** way to extend energy supplies and manage energy costs.
 - Progressive energy-saving technologies and equipment are constantly under development.
 - Siemens experts are well-versed in innovative, energy-saving facility improvements and system retrofits.
 - Facility upgrades can be funded through guaranteed energy solutions contracts.
- Energy efficiency in buildings
 - Ten buildings with 660 beds
 - Energy costs 1995: € 1.9 mio.
 - Guaranteed energy costs savings: € 511'300 annually
 - Cost-neutral modernization through third-party financing
 - Reduction of CO₂ emissions by 3,000 ton annually
 - Energy controlling, monitoring and service

Environmental responsibility



- Growing correlation between environmental practices and a company's economics.
- Organizations that adopt green practices not only discover economic advantages in the efficient and effective use of energy, but find that healthier internal environments result in increased employee health and productivity.
- Green facilities nurture good community relations



NewYork-Presbyterian
The University Hospital of Columbia and Cornell

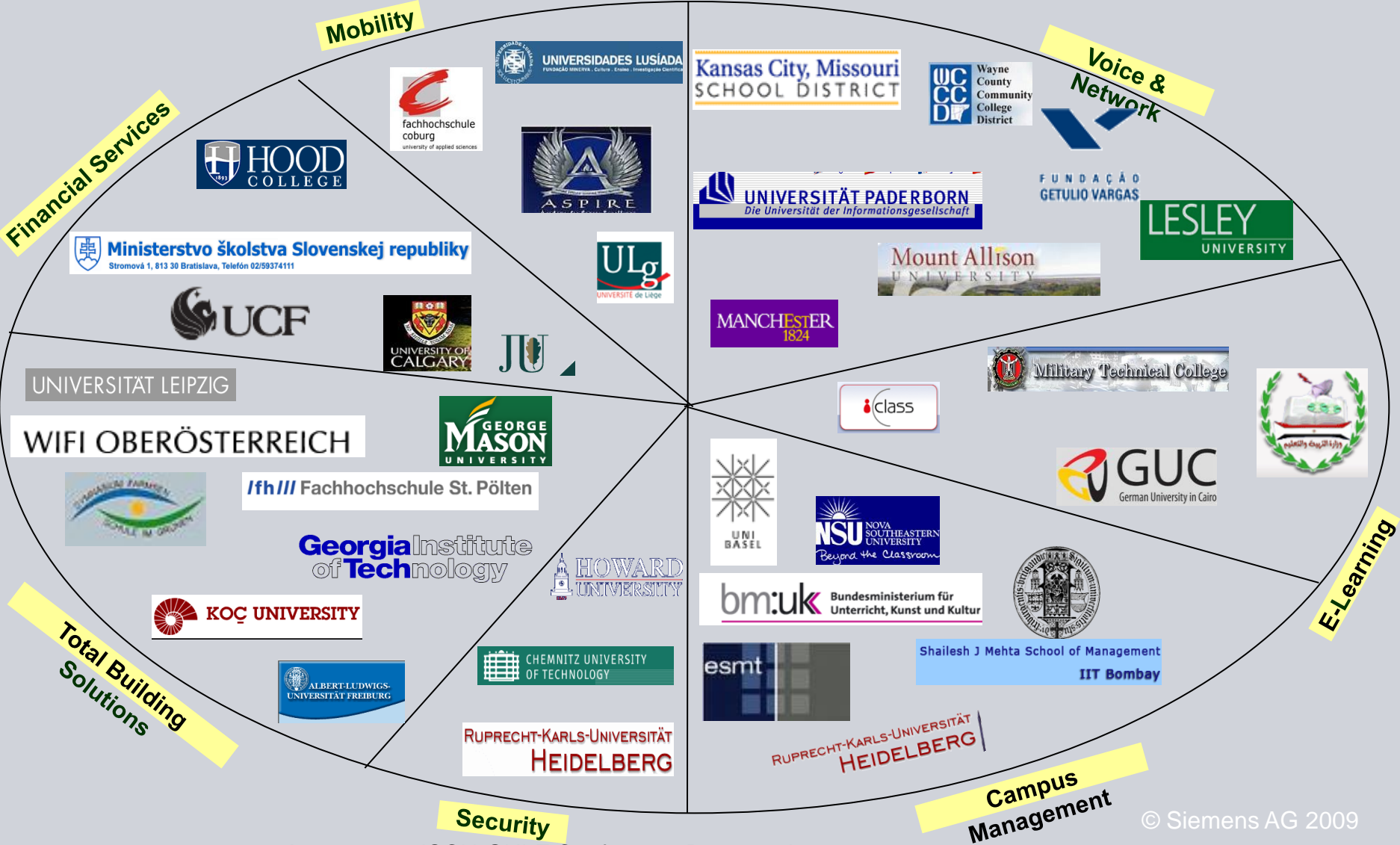
Project details

- Winners of energy star 2005 award
- Sponsored energy-related events
- Created a conservation hotline which allows staff, patients, and visitors to submit energy-saving ideas.
- Reduced operational downtime in half via building controls and remote monitoring.
- Siemens' system created an energy usage slow-down program
- Energy savings exceeded \$18 million

List of references

- [Akershus University Hospital](#), Lørenskog, Norway
[Albert-Ludwigs-Universität](#), Freiburg im Breisgau, Germany
[Athabasca University](#), Athabasca, AB, Canada
[Cliniques Universitaires UCL](#), Yvoir, Belgium
[East Carolina University](#), Greenville, United States
[Freie Universität Berlin](#), Berlin, Germany
[George Mason University](#), Fairfax, United States
[Hong Kong Polytechnic University](#), Hung Hom, Hong Kong
[Howard University](#), Washington, United States
[Humboldt-Universität zu Berlin](#), Berlin, Germany
[Klinikum der Universität München](#), Munich, Germany
[Martin-Luther-Universität](#), Halle, Germany
[Miami University of Ohio](#), Oxford, United States
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[Middle Tennessee State University](#), Murfreesboro, United States
[Ningbo University](#), Ningbo, China
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[The University of Hong Kong](#), Western, Hong Kong
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[Universität Würzburg](#), Würzburg, Germany
[Universidad de Alcalá](#), Alcalá de Henares (Madrid), Spain
[Universidad de Alicante](#), Alicante, Spain
[Universitair Medisch Centrum \(UMC\)](#), Utrecht, Netherlands
[Universität Basel](#), Basel, Switzerland
[Universität der Künste](#), Berlin, Germany
[Universität Karlsruhe](#), Karlsruhe, Germany
[Universität Leipzig](#), Leipzig, Germany
[Universität Mannheim](#), Mannheim, Germany
[Universität Mozarteum](#), Salzburg, Austria
[Universitätsklinikum Hamburg-Eppendorf \(UKE\)](#), Hamburg, Germany
[University Hospital Århus Sygehus](#), Århus, Denmark
[University of California](#), Davis, United States
[University of Central England](#), Birmingham, West Midlands, United Kingdom
[University of Georgia](#), Athens

Another few campus related references of Siemens AG



Conclusion – it's all about integration!



With “Green University” education becomes front-runner in the eco-movement

Green Philosophy

- Changing human behavior starts in education
- Create a green mindset
- Green mentality and sustainability thinking is one of the key challenges of the 21st century



Green Curriculum

- Transfer of the green philosophy into learning, research and education
- Develop new faculties

Green Infrastructure

- Living and practicing in a green environment
- Green buildings, autarkic energy supply
- Campus design and architecture



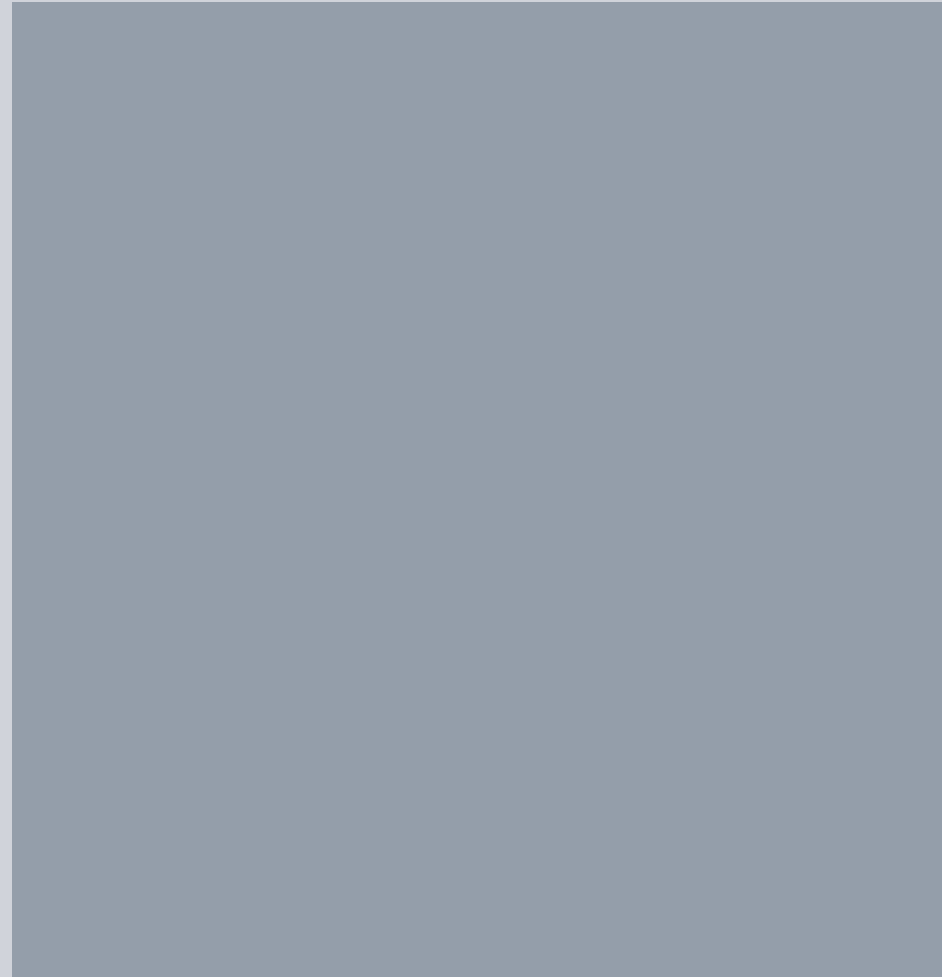
The Green University concept is a combination of green philosophy, curriculum and infrastructure.





Backup

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Value propositions



Working with the Siemens team, you can expect a tailor-made program allowing you to achieve:

- Significant energy savings via facility optimization and modernization
- Dependable, flexible and clean on-site energy generation
- Reduced commodity risk and improved energy budget control
- Energy price predictability, stability and affordability
- Industry best practices in energy management
- Progressive and balanced environmental responsibility



Subdivision: Solutions strategies Total Building Systems (TBS)

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- Trend: Overlap of IT, HVAC and electrical systems, particularly in the rooms
- Trend: Energy optimization, cost reduction, comfort and security
- Trend: Single-seat operation for all building systems

TBS is a lever to improve:

Real estate effectiveness

- Reduce Capex & Opex
- Simplified and streamlined building management
- Energy savings

Building performance

- Centralized management
- Occupant comfort, safety and security
- Environmental impact

Sihlcity - Largest construction site in Switzerland

- SBT responsible for HVAC management, automation and field level, smoke extraction plant and the redundant IP communication network
- Integration of lights, blinds, doors, alarms from other technical systems, fire dampers and weather station.
- Total volume: initial project CHF 4 mio, follow-on project estimated to CHF 2 mio.



Innovation is our lifeblood

Major R&D investments

- €3.8 billion in fiscal 2008, or 4.9% of revenue
- 32,300 R&D employees worldwide
- 17,000 software engineers
- 150 R&D locations in over 30 countries around the world
- 8,200 inventions in FY2008
- 55,000 active patents



Major innovations

- **Our patent position in fiscal 2008:**
 - ➔ Germany: No. 2
 - ➔ Europe: No. 3
 - ➔ USA: No. 11
- **Most recent innovations:**
 - ➔ Somatom Definition Flash: Worldwide first CT with fastest imaging and lowest radiation dosage
 - ➔ Efficient power transport (HVDC): the new 800-kV high-voltage, direct-current transmission system minimizes power losses
 - ➔ Digital factory: virtual factory makes production more efficient and flexible

Our innovations make a major contribution to environmental protection

Siemens Environmental Portfolio

- Nearly one quarter of our revenue is generated by products and solutions that make a direct, quantifiable contribution to environment and climate protection* (~ €19 billion).
- By 2011, income from our environmental portfolio should grow to €25 billion.
- In fiscal 2008, products and solutions in our environmental portfolio saved about 148 million tons of CO₂ for our customers...
 - ...which equals the total CO₂ emitted by New York, London and Hong Kong

* Status in fiscal 2008, reviewed by PwC



Siemens answers the world's toughest questions



Energy

Facts that prompt questions

- More than 40% increase in worldwide energy demand in the coming 25 years
- Emerging countries account for two-thirds of the increase in the world's primary energy consumption.
- Energy mix will not change fundamentally in the next 10 years.
- Increase of CO₂ emissions endangers global climate.

Siemens answers

- Market leader for offshore wind farms
- Manufacturer of largest and most efficient gas turbine
- Leading provider of HVDC lines and world's most powerful 800-kV transformer
- "Performance Contracting" offers a complete portfolio for energy-efficient solutions in buildings