Riding the Green Wave….
Improving Building Performance

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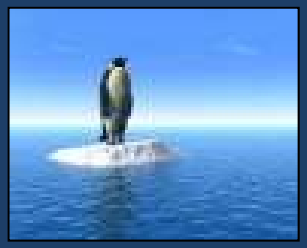
Beliefs to Question and Tough Questions to Answer



Is global warming a myth?

Will the cost of energy go down in the future?

Will environmental regulations be reduced?

Is "clean technology" the silver bullet to solve the problem?

On a personal basis, have I done everything I can?

Climate Change

It's getting warmer

Demographic Change

We're living longer

Urbanization

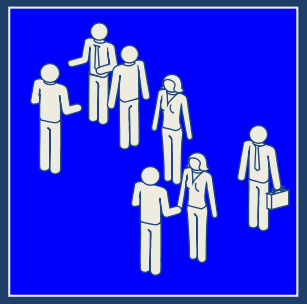
There are more people in cities

Globalization

We're doing business in more places

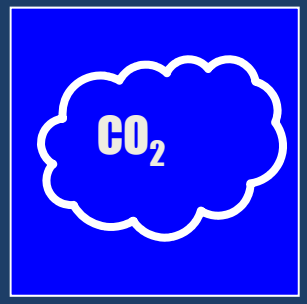
Megatrends pose urgent challenges to cities

1%
of the earth's surface



50%
of the world's population

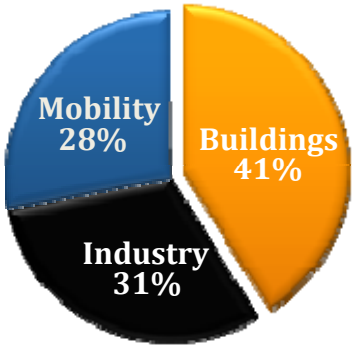
75%
of the world's energy



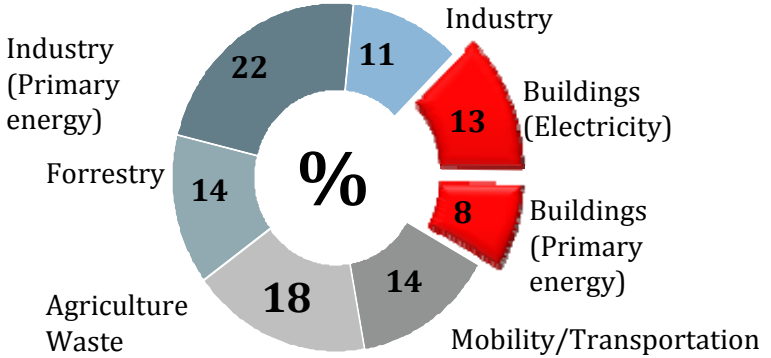
75%
of CO_2 emissions

Why Buildings?

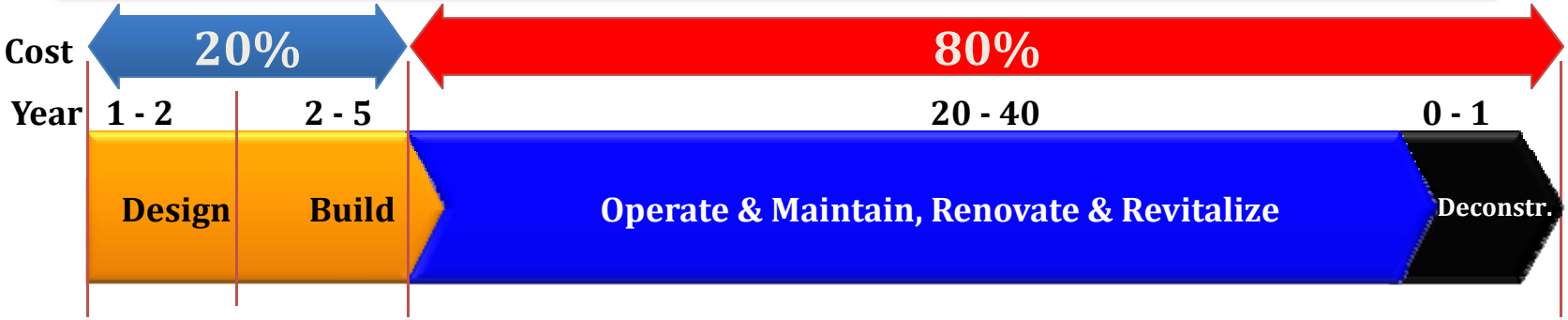
40% of the world energy consumption*



21% of the global GHG emissions***



Energy accounts for 40% of the building operation cost**



*International Energy Association, auf weltweiter Basis, im Jahr 2002 / ** Dena Congress, Berlin, 2008 / *** „Global Mapping of Greenhouse Gas Abatement Opportunities up to 2030", Building Sector deep dive, June 2007, Vattenfall AB, basiert auf Information von IEA, 2002, % der weltweiten Treibhausgasemissionen; Total 40 Gt CO2e

Common Issues For Owners And Operators of Buildings/Facilities

- **Energy Consumption Cost Reduction –** consuming the least amount of energy while still performing the core mission
- **Energy Unit Cost Reduction –** buying energy at the lowest unit cost available
- **Energy Cost Stabilization –** operating expense predictability and stability
- **Infrastructure Renewal –** replacing aging building/facility systems
- **Capital Fund Preservation –** use capital funds for core business activities
- **Environmental Responsibility -** consuming natural resources and managing waste production in an environmental friendly way.

Existing Technologies That Can Make A Difference

According to International Energy Agency:

$1 investment on energy efficiency =
$2 investment in electricity supply

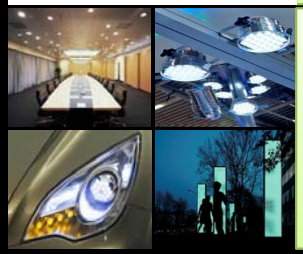
ENERGY EFFICIENCY CREATES SEVEN BASIC CATEGORIES OF BUSINESS OPPORTUNITIES

Building-technology products	Electrical devices	Transportation	Transparency-creating products	Customized solutions	Energy services	Financing of investments
• Space heating • Windows • Insulation • Elevators • Water boilers	• Appliances • CF lamps • Office supplies • White goods • Consumer electronics	• "Eco" cars • Locomotives • Carbon structure • Regenerative braking • Tires	• Advanced metering • Smart grids • Eco Drive program • Navigation devices	• HVAC* systems for buildings • City lighting • Measurement and control systems	• Energy consulting • Demand monitoring and mgmt. • Heat and power from cogeneration	• Earmarked loans • Leasing of equipment

* Heating, ventilation, and air conditioning.
Source: McKinsey Global Institute analysis

- Modern heating boilers achieve fuel savings of up to 40%
- Compared to low-temperature boilers, the combination of condensing boiler and solar plant reduces fuel consumption by about 30%

- Modern chillers require only about 50% of the energy consumed by old centrifugal machines
- Running on alternative fuels (e.g. natural gas) when electricity prices are high



- The life expectancy of energy-saving lamps is 15 times that of conventional incandescent bulbs, LEDs 50 times and using about 80% less energy
- If 30% of all incandescent bulbs were replaced by energy-saving lamps worldwide CO2 emissions would drop by about 270 million tons p.a.

- The systems ensure demand-dependent control and management of all technical building systems while giving consideration to the building's usage requirements
- Advanced building automation and control systems offer energy savings of 20 to 40%[3]

New Technologies That Can Make a Difference

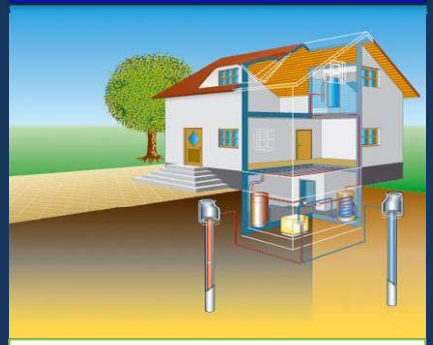
Wind power [1]

- Small, light installations
- Easy to install on roofs
- Produce up to 10,000 kWh p.a.
- Produce enough electricity for 2 low-energy houses or one office with 20 workplaces

Solar heat and solar power [2]

- 50% efficiency
- 50% increase in solar heat in Germany in first half of 2008
- Cristalline silicon solar modules convert 13 to 18% of solar energy to electrical power
- Thin-film solar modules have efficiencies of 5 to 8%

Geothermal energy and heat pumps [3]



- 25% energy is required to produce 100% heat output
- 38% less CO_2 emissions compared to gas heating, and 57% less compared to oil heating
- Only 40% of operating costs of a typical gas heating system

Combined heat and power plants (biomass) [4]

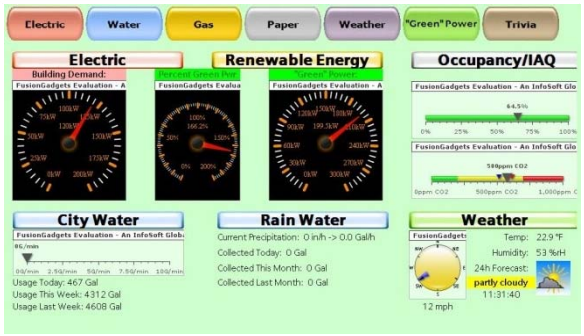
- In 2007, co-generation plants in Germany produced 21 GW (12%) of all electrical power generated
- In Germany, the potential of co-generation plants that could be economically used amounts to about 57% of all electrical power generated
- Bio co-generation plants produce 70% less CO_2 than conventional power plants [(5)]

Efficient and distributed energy generation is a reality

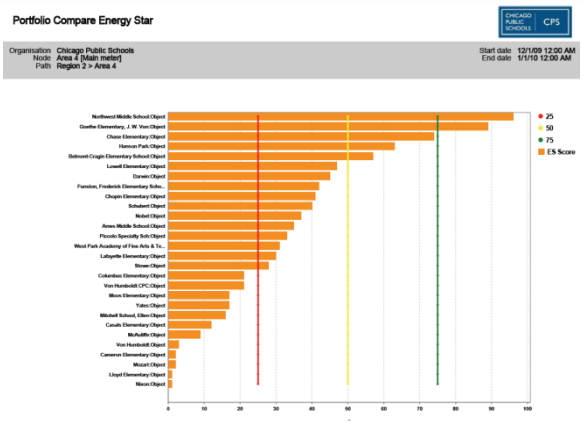
Sources: (1) Der Spiegel, "Ökologisch bedacht", 1.9.2008 / (2) Bundesverbandes Solarwirtschaft (BSW-Solar) / (3) Bundesverband WärmePumpe (BWP) (4) Jahrestagung, Bundesverband Kraft-Wärme-Kopplung (B.KWK), Berlin, Nov 2007 / (5) VDMA Power Systems, „Markt für Biogas-Technik fällt in Dornröschenschlaf zurück", 17.12.2007

Utilize Existing Technologies to Measure Building Efficiency and Increase Awareness

Energy Consumption Dashboard



Energy Star Benchmarking



Green Touch Screen

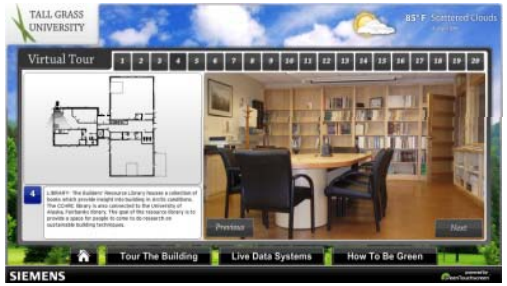
Behavior Modification Can Be Impactful

Executive
Easily tracking progress against energy goals

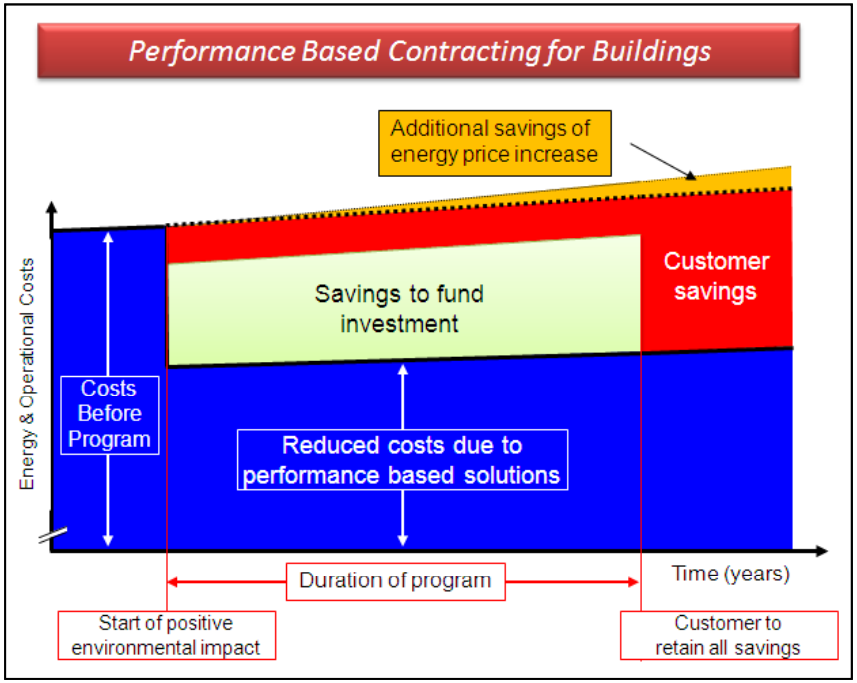
Engineer
High level monitoring of complex data and understanding of critical issues

Occupant
Educating and motivating building stakeholders to reduce energy consumption

Public
Strengthening education to promote community awareness

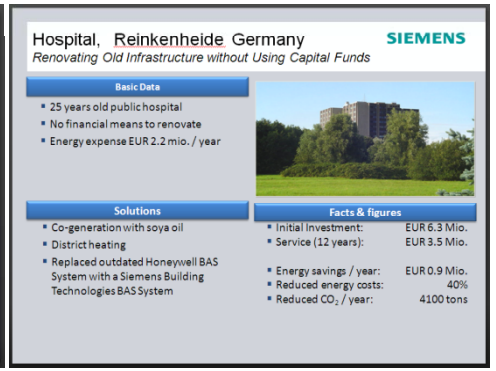


Proven Business Models to Implement Energy Efficiency Projects in Buildings



Energy Services Company Industry

....Thousands of Projects, Tens of Thousands of Buildings, Billions in Savings



Focused on Efficiency	Faster Design, Quicker to Completion	Leverages Capital Funds	Efficiency Performance is Measured & Managed
Impactful to Sustainability!	Can Create Jobs Quickly!	Pays back from Savings!	Results are Guaranteed!

Rethinking Building Design

Smart Buildings

A safe, secure, reliable, and comfortable facility that integrates and optimizes supply, demand, operational, and sustainability strategies that maximizes life-cycle value.

Future Buildings

Dr. David Fisher's revolutionary Dynamic Tower is the world's first building in motion that challenges traditional concepts of architecture .

Offering infinite design possibilities, each floor of the Dynamic Tower rotates independently at different speeds, in different directions, resulting in a unique and ever-evolving shape, and introducing a fourth dimension to architecture: Time.

The Dynamic Tower is the first 100% self-powered Green building with the ability to generate electricity for itself through the use of horizontal wind turbines and solar panels.

- Pre-Fabricated Construction
- Imbedded Wind Turbines
- Imbedded Solar Panels
- Rotating Floors

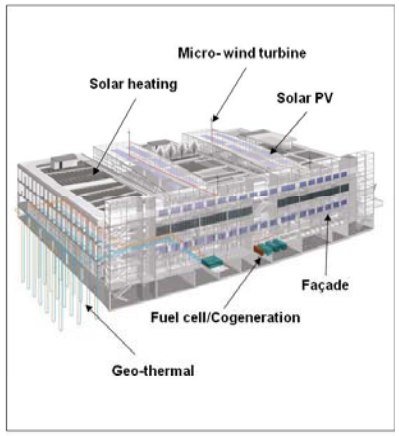
Net Zero Energy / Net Zero Carbon

Net zero energy

- Buildings act as power plants with on-site power generation
- E.g. solar energy, geothermal energy
- Net annual energy consumption zero

Net zero carbon

- Active carbon management
- Zero emission/waste



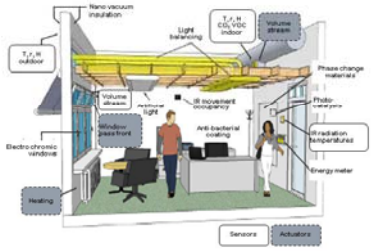
Self-sufficient Buildings

Micro- level energy management

- Energy reduction measures at micro level
- Personalized environment control
- Dynamic building modeling at micro level

Self-commissioning

- Use of technologies such as AI
- Cost savings (labor)
- Minimal emergency repairs



Actions to Accelerate the Implementation of Efficiency & Sustainability

1	Green Buildings and Sustainability are Competitive Differentiators – Embrace the Paradigm Shift
2	Adopt a Holistic Approach to Energy Efficiency and Sustainability
3	Use Life-cycle and Environmental Impacts in addition to ROI Analysis
4	Join the Multi-stakeholders Discussions on Policy and Regulations
5	Require Supply Chain Partners to have Sustainability Programs
6	Every Organization Needs to have a Chief Sustainability Officer
7	Do Your Part as an Individual