

Smart Buildings A eficiência energética em edifícios é a resposta. Qual é a pergunta?

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What influences the market?

Growing of population



By 2025: World population will grow from more than 6 billion now to 8 billion.





By 2030: 60% of the world's population will live in cities.

Care for the environment



Today we face the **highest CO² concentration** for the past 350,000 years.

Scarcity of resources



50% of the world's population consume75% of the energy.

- The need of protection of critical infrastructure is increasing.
- The requirements concerning the security of life and property are constantly increasing.
- The consumption of energy and the CO₂-emissions have to be reduced dramatically.
- Comfortable working and living conditions are increasingly required.

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Portuguese Energy Characterization



Fonte: International Monetary Fund, World Economic Outlook Database, April 2012; The World Bank - World Development Indicators & Global Development Finance, DGEG

Energy Dependency



Final Energy Consumption by Sector 2012 (%)



Fonte: DGEG, "Caraterização Energética Nacional 2012", 2014



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Future energy challenges





Buildings: Energy challenge and untapped energy savings potential



International Energy Association, auf weltweiter Basis, im Jahr 2002 1)

Dena Congress, Berlin, 2008 2)

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Smart Grid with Smart Buildings are the solution to mitigate future energy challenges





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Grid and building have entered the development phase of becoming "smart"

Evolution of grid and building Smart Smart Grid **Prosumer** Efficient integration of renewable and distributed generation by VPPs Trend towards decentralized grid **Smart Grid Pilots** structures Virtual Power Plant in Europe **Traditional** Large smart meter installed base Demand Response market in Distribution automation; full know-US **Decentral Generation** ledge of grid status down to LV-level First Microgrid pilots Political trend (e.g. EEG) S First smart metering roll-outs First pilots for wind and PV plants Ű **Central Generation** Citi Smart Building in Smart Grid Central generation Intelligent energy consumption **Building Performance** plants Energy supply-side management Central T&D concept **Energy Efficiency** Local energy generation Smart **Building Automation Total Building Solutions** Energy storage **Building Management System** Remote building and energy **Building Control** Interface to smart grid Integration of other technical management HVAC Control subsystems, e.g. PV First demand response Pneumatic technology applications (Sitecontrols) 2012 -2015-2020 1990 2000

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Functions of Smart Buildings in Smart Grids



Source: BT BAU

BEMS: Building Energy Management System





Value of a Smart Building in a Smart City

Peak load reduction

Load shifting

Co-generation/storage

Cost and CO₂ reduction

Optimized network planning

Energy consumption optimization

Integration of renewable energy

E-mobility charging

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Building Efficiency

- Building management
- Monitoring, controlling and forecast, load management
- HVAC, Lighting
- Integration of solar, electrical/thermal storage
- Grid gateway







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Smart Buildings manage optimally local consumption, generation and storage, by providing detailed monitoring



Building Energy Management System (BEMS)

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Smart Buildings manage optimally local consumption, generation and storage, by providing detailed monitoring



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Building Life Cycle Management

	Design & Build	Maintain & Operate	Renew & Revitalize
Gre	en Consulting		
			Financing
			Performance Guarantee
			Alternative Energy Supply
		Infrastructure Mod	lernization
		Continuous Optimization	
		Analysis & Energy Audit	
		Operational Support	
		Monitoring & Benchmark	
Con	Consumption Measurement & Data Collection		
	Training		
Max	kimum Efficiency Components		
		System Upgrade & M	Migration
Buil	ding Automation	Maintenance	





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Smart Buildings in Smart Grids are driven by:





Investment in sustainability and ROI are closely connected







Smart investments in efficiency achieve numerous financial, environmental, and efficiency benefits



Energy savings are possible, in every building – in every business 20% to 40% is realistic!

Value of efficient buildings

- Green Buildings are 0-5% more expensive to build
- Energy efficiency ~25% 35% vs. traditional construction
- ROI for building owners can be significant

Financial benefits

- Overall, 6% higher rental rates
- 16% higher selling price
- Higher occupancy





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With Smart Buildings in Smart Grids towards Smart Cities





The Environmental Conscience and Economic Development





How Smart Buildings in Smart Grids will boost the competitiveness of smart cities

Economical Aspects

- Cost reduction through energy and operational efficiency
- Increase of building's value
- Attractiveness for companies
- Avoidance of costly grid infrastructure investments

Social Aspects

- Positive image
- Increased productivity
- Security/healthy life conditions
- Attract highly qualified workforce

Environmental Aspects

- Optimized use of resources
- Efficient use of renewable energies
- Reduction of green house gases
- Foundation for sustainbable e-mobility

Open boundaries/ challenges

- Regulatory & Legislative framework
- Sufficient potential in energy markets for marketing flexibility
- Load flexibility potential of commercial buildings

- Time and load dependent pricing spread
- Customers complexity
- Standardization and protocols
- IT security



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What is the Questions ?

Something that is **universally accepted** as the discussions on energy ...





Contact page



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Thank your for your attention!

Questions and answers