

Smart buildings

CATRENE Workshop on Smart Cities
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Smart Buildings

- Trends and market drivers
 - Energy costs and greenhouse gas prevention
 - Buildings account for 40% of total energy consumption
 - Energy system must be adapted to renewable energy supply
 - Lifestyle / Comfort / Safety / Security
 - Dropping prices for microelectronics
 - Ubiquitous network connectivity, smart phones
 - Aging society / Health
 - Ambient assisted living, emergency detection

Smart Buildings

- Technological requirements, general aspects
 - Long replacement times (~ 15 years)
 - Interoperability
 - Cost efficiency
 - Simple system integration and user interface

Smart Buildings

- Future key products
 - Solid state lighting
 - Best energy efficiency + superior control of light quality + smaller form factors possible
 - indoor: Currently mostly retrofit (with loss of functionality)

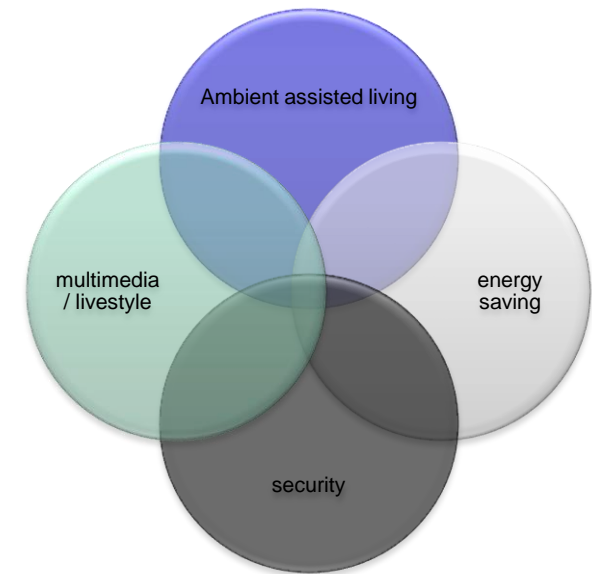


Smart Buildings

- Future key products
 - Solid state lighting
 - Indoor
 - medium / low lumen output requirements, achieved
 - user interaction / control crucial, tbd
 - Power supply (110/230 V AC to low voltage DC)
 - Change in manufacturing: non replaceable light source
 - Outdoor
 - High lumen output required, tbd
 - Little if any user interaction
 - No retrofit

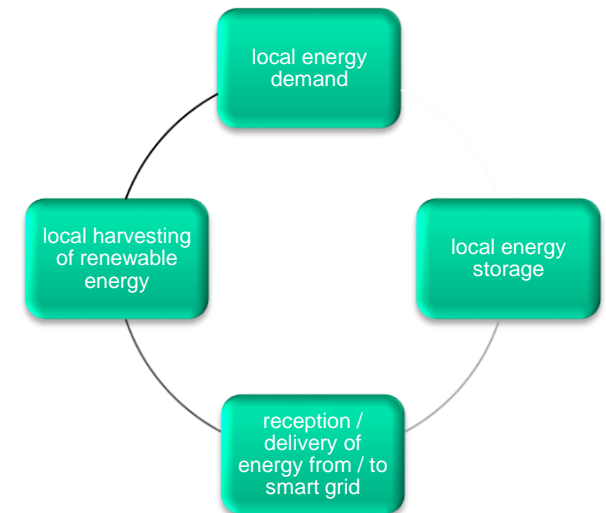
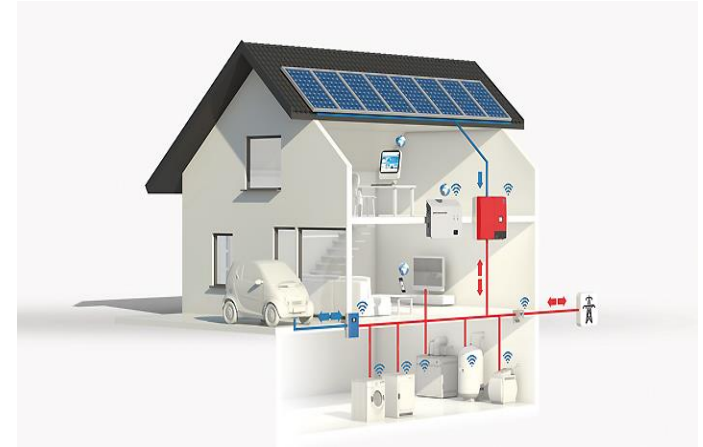
Smart Buildings

- Future key products
 - Sensors, room control, smart home systems
 - Multiple functions -> communication
 - wired / wireless
 - standardization ?
 - Sensors:
 - presence / activity
 - low power wireless / easy to apply
 - maintenance-free
 - Security / safety
 - Intrusion detection
 - Fire alarm



Smart Buildings

- Future key products
 - Building Energy-Management
 - Local energy sources: PV / CHP + storage
 - Integration of renewable sources yields complicated energy systems
 - Cost-benefit-ratio, business models



Smart Buildings

- Future key products
 - Indoor communication
 - Low data rate for building automation / security
 - Low power, low maintenance, easy integration
 - Medium / high data rate for interactive IP-based applications
 - Tele-presence, video-on-demand etc.
 - NFC
 - PoS, info terminals

Smart Buildings

- Recommendations for research
 - SSL
 - High lumen output for outdoor applications
 - Energy efficiency for low cost power converters
 - Control systems for brightness and color
 - Sensors for smart home / energy management
 - Low cost, low power, easy-to-deploy, intelligent sensors
 - Intelligent presence / activity detection consistent with privacy

Smart Buildings

- Recommendations for research
 - Power converters
 - Systems for management of electrical energy from local renewable sources & storage -> see energy chapter
 - Indoor communication
 - Low data rate, low power, easy-to-deploy, robust, secure wireless systems
 - High data rate wireless (further advancement of 802.11)