SMART BUILDINGS DECODED
A concept beyond the buzzword

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Smart buildings empowering energy consumers
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90% of our time is spent indoors

97% of EU buildings is not future proof
Europe is not ready to transition to smart buildings

• Which environment on country level fosters an uptake of smart buildings?
• Leading countries have implemented progressive and holistic approaches to decarbonize the energy system
Buildings recognise, predict, and respond to needs, lifestyles, and habits of occupants.
Increasing viability of RES & storage

From grid parity to battery parity on the German market

Source: GTAi

Source: Bloomberg New Energy Finance
Actual vs designed energy consumption

Monitoring designed and actual heat use of low-energy dwellings and the effect of user behaviour on the final energy demand

Source: Ghent University
New functions of (smart) buildings

- Energy consumer
- Energy producer
- Energy storage (heat & electricity)
- Demand management
- Docking station for e-mobility
- Occupant behavior-responsive
- ...
Buildings are becoming micro-energy hubs
Two narratives competing to be the ‘real’ beneficiaries of smart buildings

Smart buildings contribute to the stabilisation of the ENERGY SYSTEMS with storage capacity & demand response activities.

OCCUPANTS reap the benefits of smart technologies adapting to their needs and preferences.

- Larger uptake of renewable energy and electric vehicles
- Decreasing fossil fuel dependency
- Occupants save energy and money
- Healthier and more comfortable living and working environment
Building on existing definitions

A Smart Building has a functional, comfortable and healthy indoor environment and its very low energy demand allows for a wide choice of cost-effective, renewable energy sources to be used to fulfil that demand.

EuroACE [10]

Smarter buildings are well managed, integrated physical and digital infrastructures that provide optimal occupancy services in a reliable, cost effective, and sustainable manner.

IBM Research Collaboratory

Smart buildings give us unprecedented insight into a building’s performance – at a single site or across an enterprise by integrating building systems and utilizing advanced analytics in order to monitor, measure and manage the building in the most efficient way.

Smart Buildings LLC [7]

Smart Buildings are self-aware and grid-aware, interacting with a smart grid whilst focusing on the demand response and an increased grid of controls.

Kiliccote

Smart buildings are buildings which integrate and account for intelligence, enterprise, control, and materials and construction as an entire building system, with adaptability, not reactivity, at the core, in order to meet the drivers for building progression: energy efficiency, longevity, and comfort satisfaction.

Duckman & Beck [4]

Smart buildings improve the productivity of people and processes by leveraging technology & actionable information to help you & your building make better decisions and become smart, efficient and sustainable.

CABA [13]

Smart buildings figure out behaviour and behave according to impacts of parameters around it.

A smart building is the integration of building, technology, and energy systems. These systems may include building automation, life safety, telecommunications, user systems and facility management systems.

Johnson Controls [12]

Smart home needs an efficient living space in which consumers can benefit from self-generation of electricity and smart and interoperable appliances which have been designed fast and manage consumption through consumer-friendly smart metering systems.

BEUC [5]

Siemens [11]

WELL Building Institute [9]

More efficient. From workplace sensors that continuously monitor air quality to wearables that track your health data, we have more information about the environment and health than ever before.
A smart building is **highly energy efficient** and covers its very low energy demand to a large extent by on-site or district-system-driven **renewable energy** sources.

A smart building:

- stabilises and drives a faster **decarbonisation** of the energy system through **energy storage** and **demand-side flexibility**;
- **empowers its users and occupants** with control over the energy flows;
- recognises and reacts to **users' and occupants' needs** in terms of comfort, health, indoor air quality, safety as well as operational requirements.
EU legislation to create an environment where smart buildings can foster
EU legislation plays an important role in:

- Energy Efficiency Directive
- Energy Performance of Buildings
- Renewable Energy Directive
- Electricity Directive & Regulation
Smartness indicator

Effective indicator

- Meaningful info
- Benefits
- Market pull
Thank you...

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