# Towards a digital lighting future

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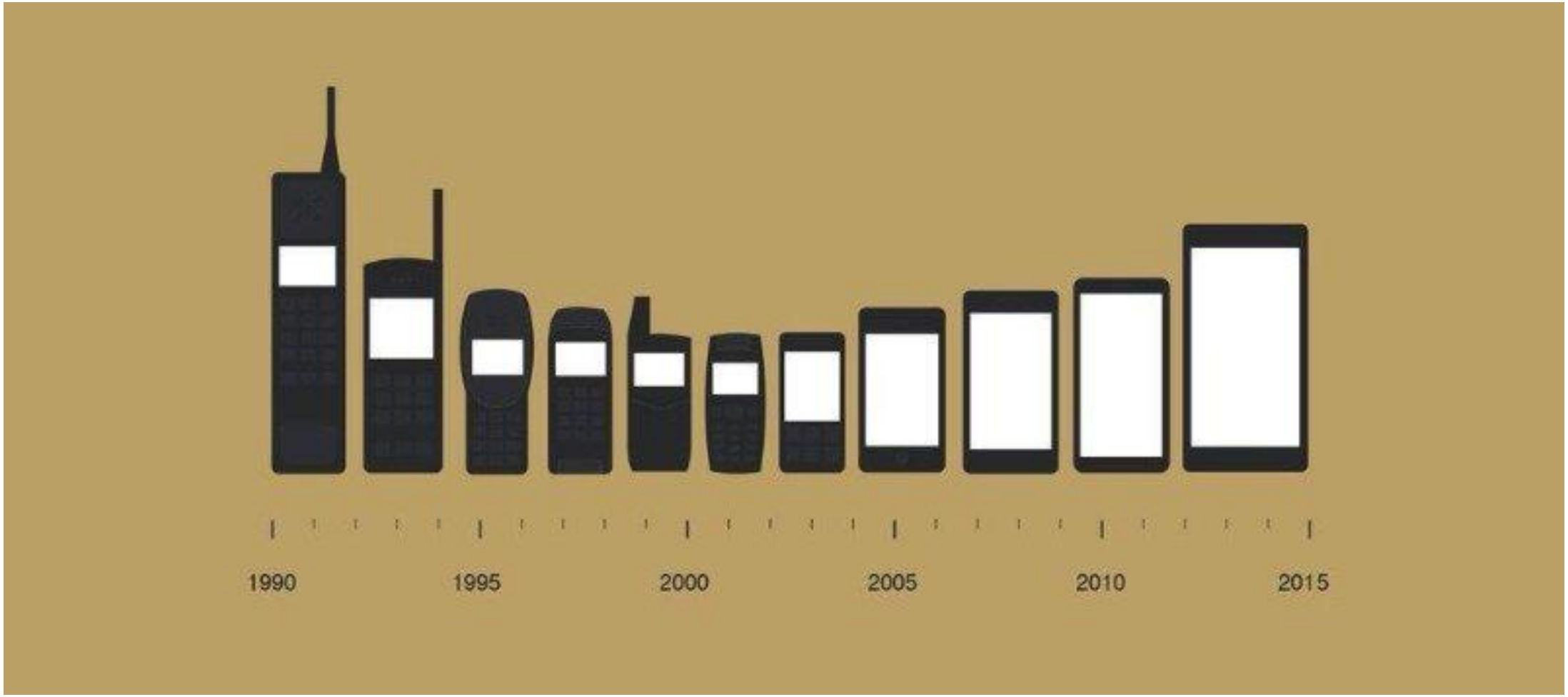
CEO BU Digital Systems

LED event – Mechelen (B) – Nov 30th, 2016
LED event – Den Bosch (NL) – Dec 1st, 2016




OSRAM

# 1995


1990
1995
2000
2005
2010
2015

# Global megatrends drive the demand for smart infrastructure

## Once things get connected, the system can become smart

Sustainable developments

Urbanisation

Demographic change

Digital connection
Mobile working

**Smart** is rapidly becoming affordable:

**Smart infrastructure** is enabled costs of memory (Moore's law for memory density), wireless connectivity and cloud computing

# Are you ready for the big data explosion?

# Smart infrastructure can be split into segments

## Smart Building, Smart City, Smart Home

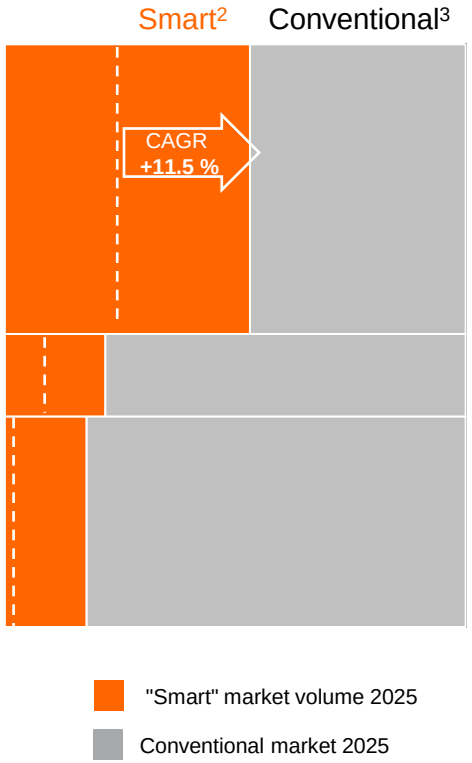
**Smart building is the leading segment for lighting in terms of absolute size/growth**

### The market for smart lighting in 2025

**Indoor**
- Office
- Shop/retail
- Hospitality
- Industry

**Outdoor**
- Streetlight
- Facade

**Residential**

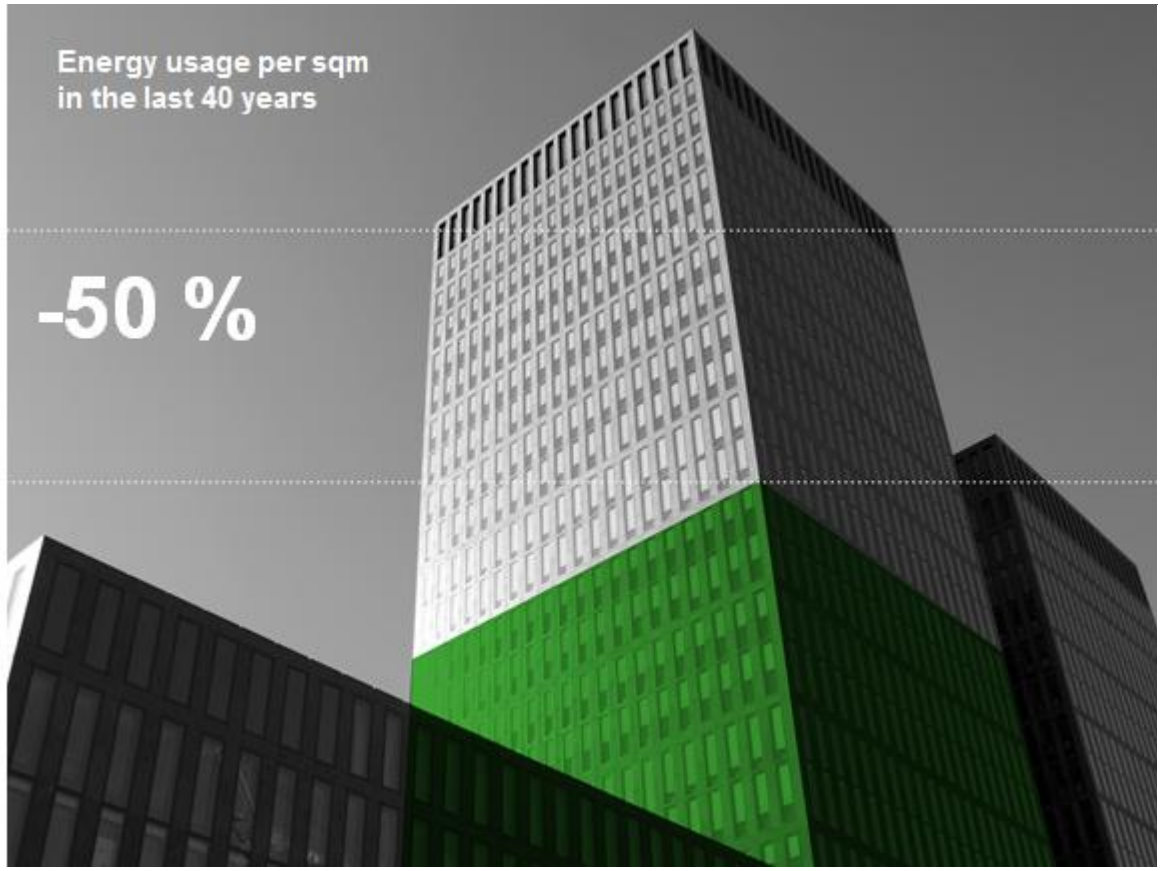


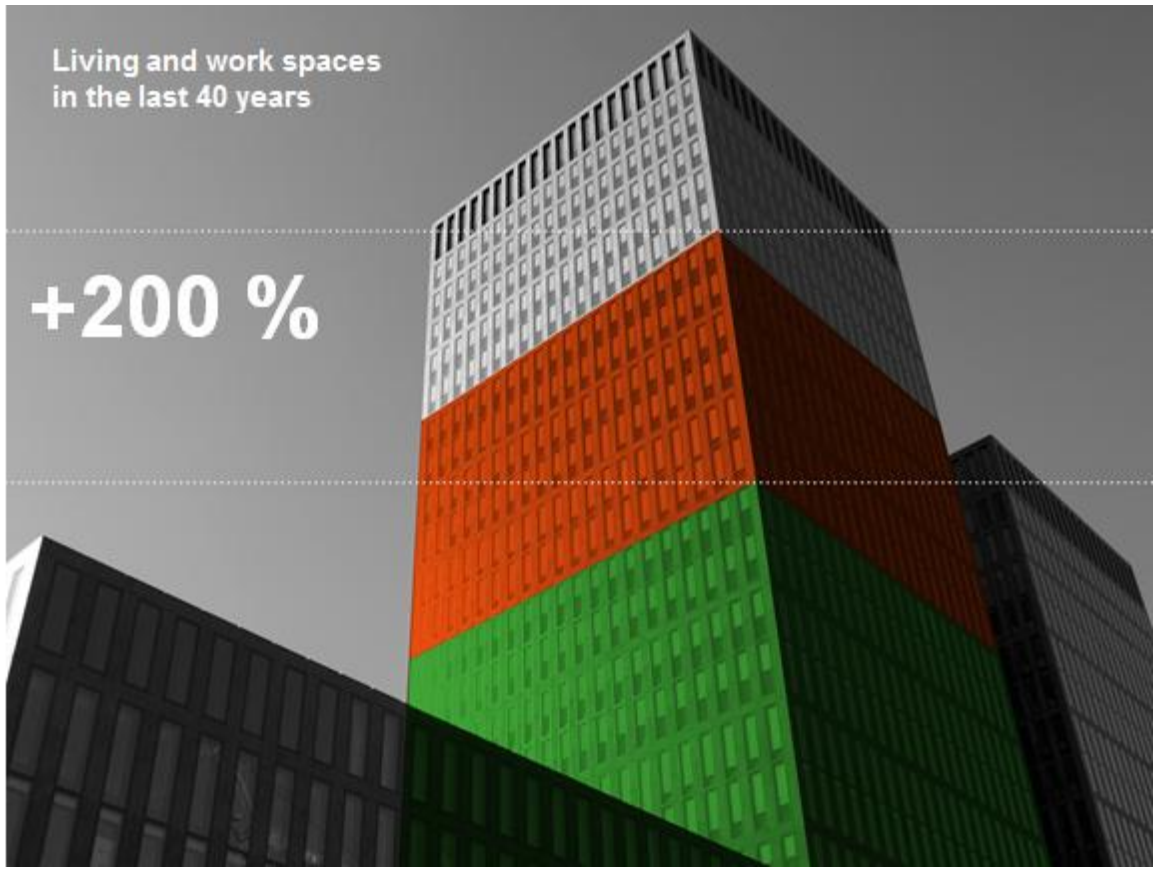

### Key observations

- Today, the market for smart infrastructure with smart lighting is **at an infant stage**
- **Growth, however, is twice as fast** as the overall lighting market
- **Smart building is the leading segment**

# Long-term trends in Buildings – need for change

## Building construction industry consumes 60 % of global resources




Although our energy consumption/$m^2$ went down, we use much more space!

→ **Smart** usage of buildings is crucial

# A simple model for Smart buildings:

## observe/understand the space and trigger intelligent action

**For this, a higher level of functionality and a more advanced technology than used in conventional buildings are needed**

- More **sensors** to understand the direct environment and user behaviour
- More **communication network** power to communicate/aggregate data
- More **data analytics** to translate data into information in order to trigger relevant action

| | | |
|---|---|---|
| **Central control** | **Central data analytics** to create relevant information and trigger building-wide actions | BMS server, cloud data services |
| **Network** | **Communication networks** to transmit data (across various levels: room, floor, building) | Wi-Fi network, bus systems etc. |
| **Local operation** | Local triggering of actions (e.g. on product/room level) | Thermostat, light dimmer etc. |
| **Sensing** | Capturing data about condition/state of a room or product **via sensors** | Sensors (temperature, $CO_2$, occupancy etc.) |
| **Action** | Individual **product** providing service or action to building user/owner | Light, HVAC etc. |
| **Power** | Access to and control of **power** as prerequisite for operation/actions | Power lines and plugs, control gears (ECGs) |

**Old world**: Prerequisite in "conventional buildings" **Smart world**: New capabilities needed to enable smart buildings

# The ecosystem for a Smart Building: partnerships are crucial

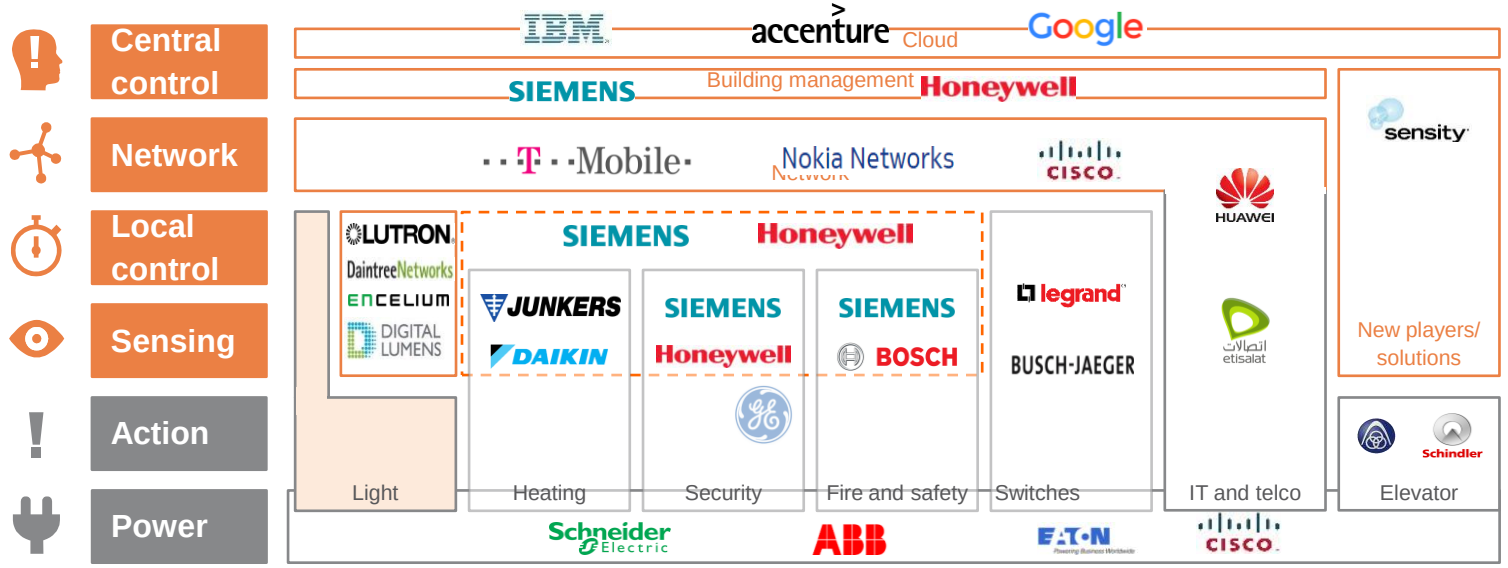
## Lighting becomes part of the “Internet of Things”

**Critical elements in smart buildings:**

- **Software** (esp. location of intelligence/local vs. central control)
- **Communication technology** (esp. wireless solutions)
- **Application know-how** (intelligent actions) and **market access**

**This, however, results in relevant market dynamics/issues:**

- **Northbound tends to drive southbound** via communication protocols and data structure
- **Security** prevents fully open communication protocols
- **Latency requirements** favors decoupling point between central control and local control



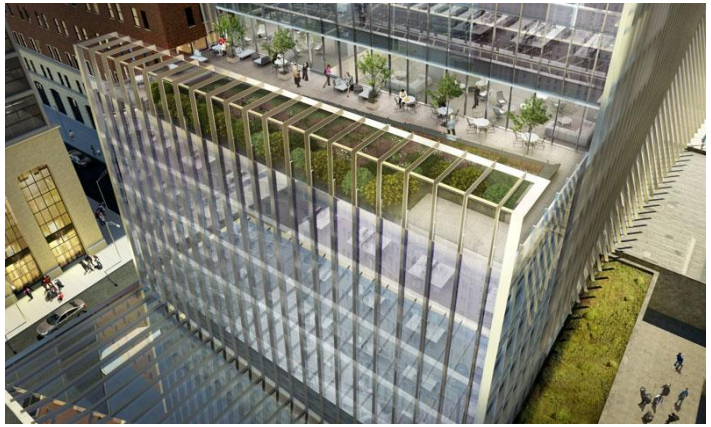

*Company names are examples*

# Smart Lighting in Smart Buildings is rapidly emerging

## Proof points from North America

Current progress of construction

Artist's rendering



Artist's rendering

**EY Tower: Toronto, Canada**
**Scheduled opening: June 2017**

**OSRAM is the selected lighting control partner**

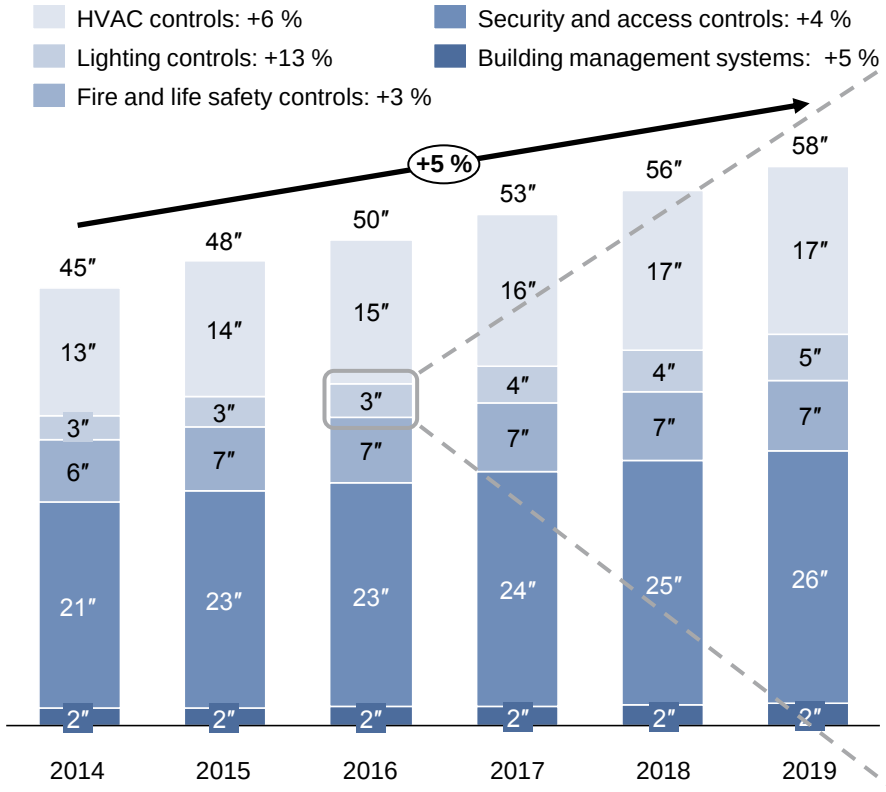
- **90,000 m² (42 floors), LEED Platinum property**
  Premiere smart building
  Anchor tenants: Ernst & Young and OMERS Private Equity

- **ENCELIUM™ lighting control system**
  Market-leading control system for building-wide lighting controls


- **Why ENCELIUM™?**
  1. Scalable standard communication protocol solution (DALI, ZigBee®, BACnet)
  2. Easy upgrade of standard fixtures with ENCELIUM™ controls
  3. Proven end-to-end security solution for wireless (GSA)

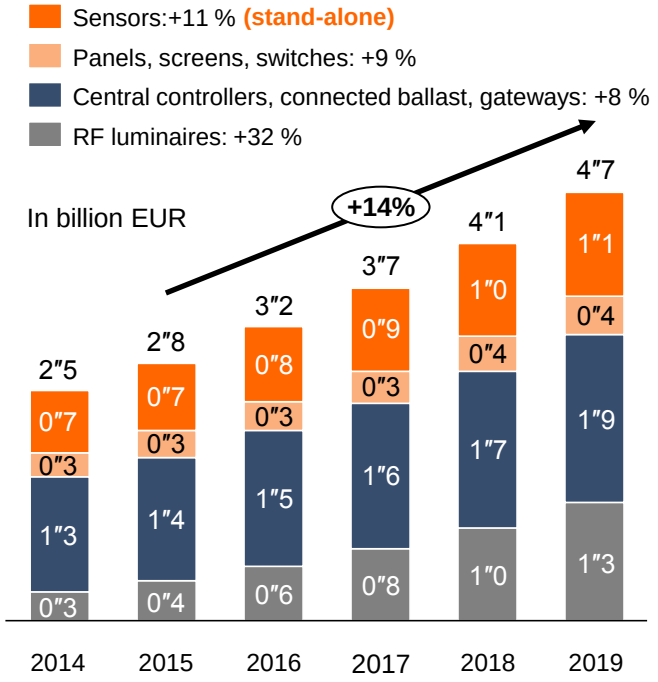
# Which components in Smart Building offer the biggest potential?

- **HVAC and security largest segments, yet lighting has highest growth**
- **Within lighting: Sensors and RF fixtures offer biggest growth potential**




Source: Navigant – Commercial Building Automation Systems – 4Q14

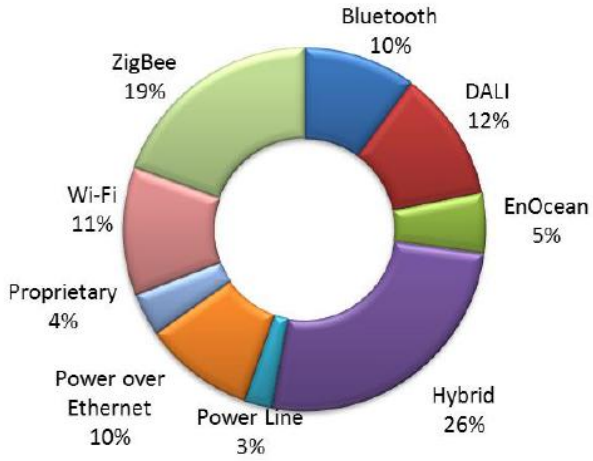
## Lighting controls components market




Source: IHS - Smart Lighting and Connected Lighting Controls - Oct 2015

## Communication protocols

Strong growth in wireless
**ZigBee® will be dominant**




Source: Strategies in Light; market view 2022

# Smart building use cases will force lighting to refocus

## focus less at energy saving/TCO and more at value-add use cases

**Needs of the building owner / user:**

| Fulfill regulatory/basic requirements | Reduce operating costs (TCO) | Improve operational efficiency | Enhance end-user experience |
|---|---|---|---|

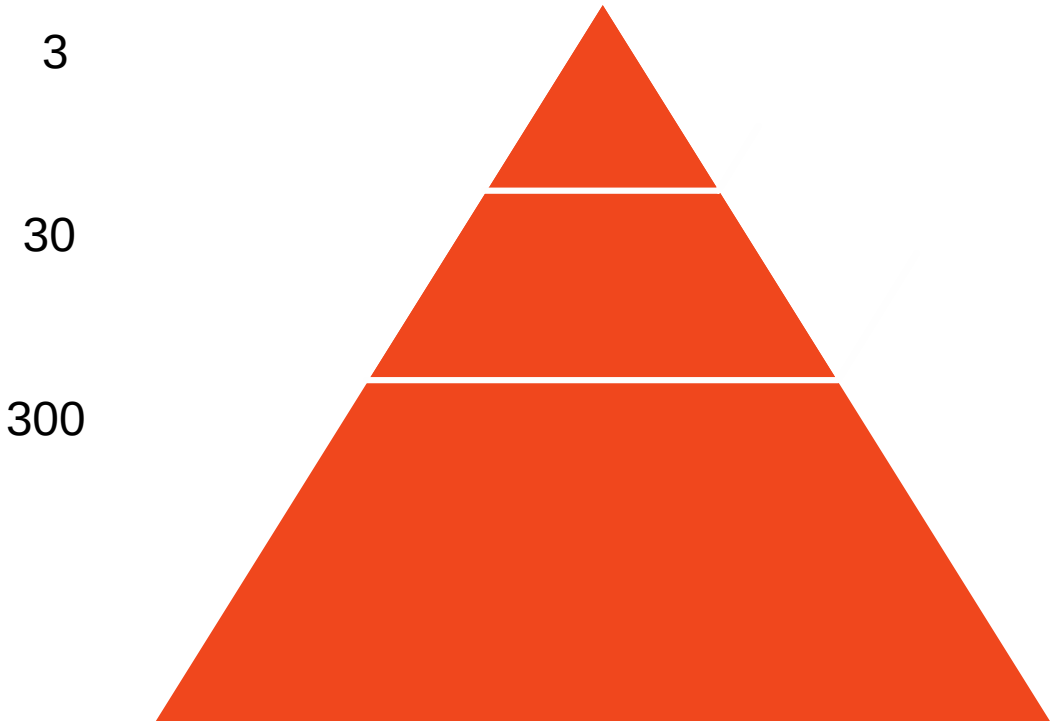
**Classic use cases, but business potential declining after LED upgrade!**

**Upcoming use cases – opening up new market opportunities!**

- **Basic functionalities,** e.g. basic illumination, heating and security
- **Energy costs**, e.g. reduced consumption of electricity/fuel
- **Labor productivity**, e.g. optimized allocation of staff
- **Health and comfort**, e.g. increased well-being of staff
- **Safety and fire/security**, e.g. fast building evacuation
- **Maintenance costs**, e.g. reduced effort for inspection/repair costs
- **Asset utilization**, e.g. optimized allocation of goods = reduced CAPEX
- **Indoor navigation,** e.g. smart positioning services to increase user-friendliness

**Upcoming value-add use cases tackle more complex problems – this calls for complete solutions**

# Introducing the 3-30-300 rule



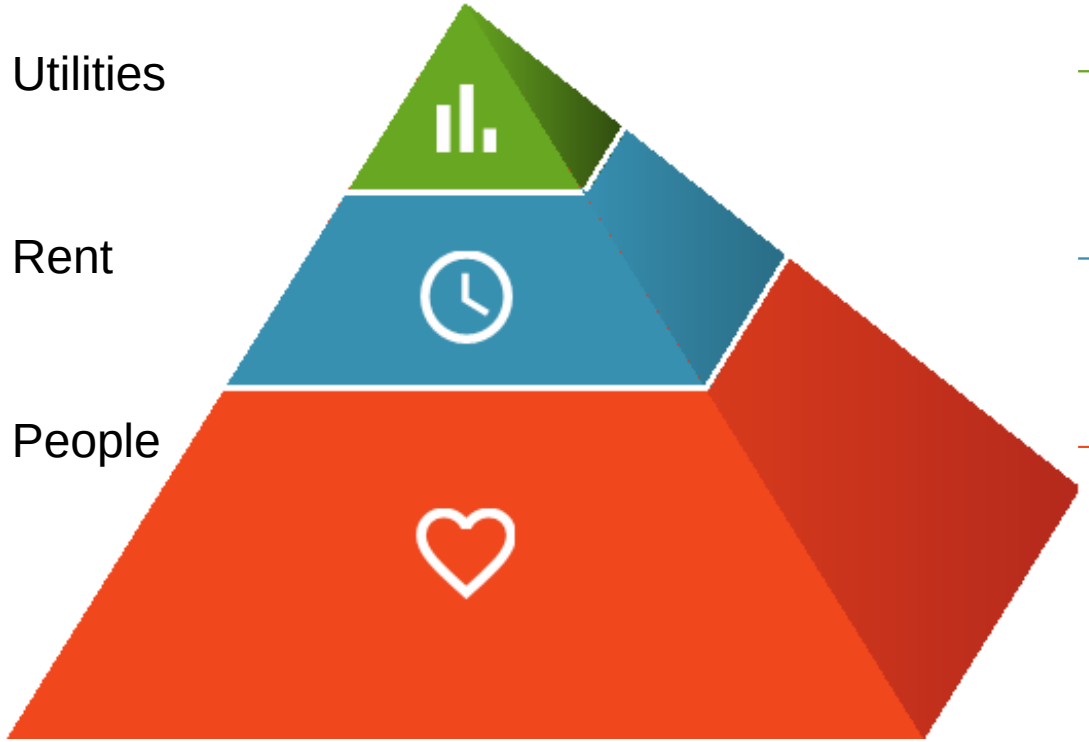
# The 3-30-300 rule

## The lighting industry can harvest more value if we focus on 30 or 300 …

→ 3 € Utilities → Energy efficiency

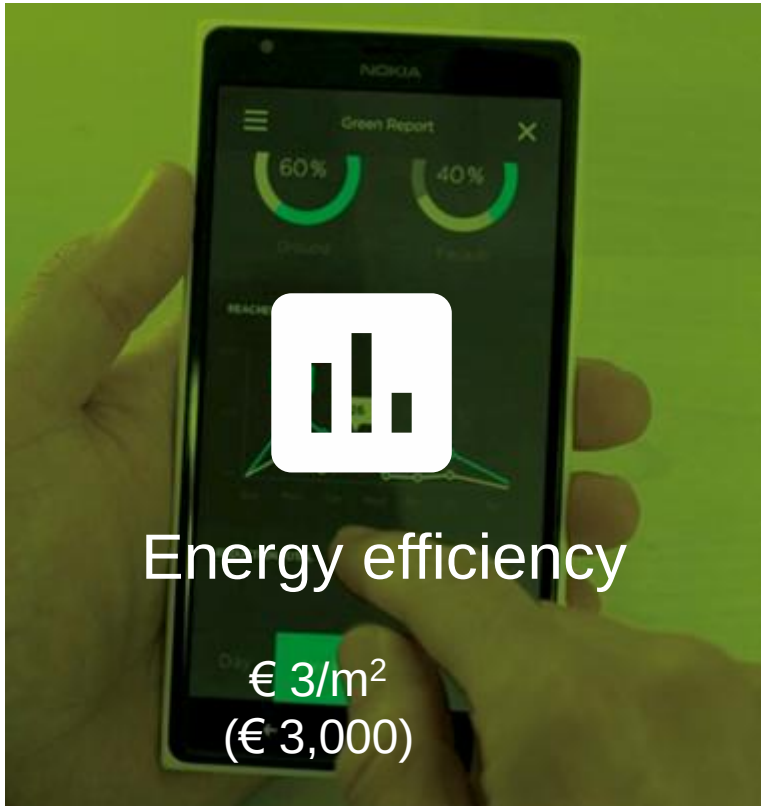
→ 30 € Rent → Space efficiency

→ 300 € People → Personal efficiency



# The 3-30-300 rule in smart buildings

## Quantifying for 3% improvements in a 10.000 $m^2$ building





# Extracting more value in Smart Buildings

## Example 1: focus on 30

What if ...

… you could use sensor data to dim the lights
but also to optimize space utilization?

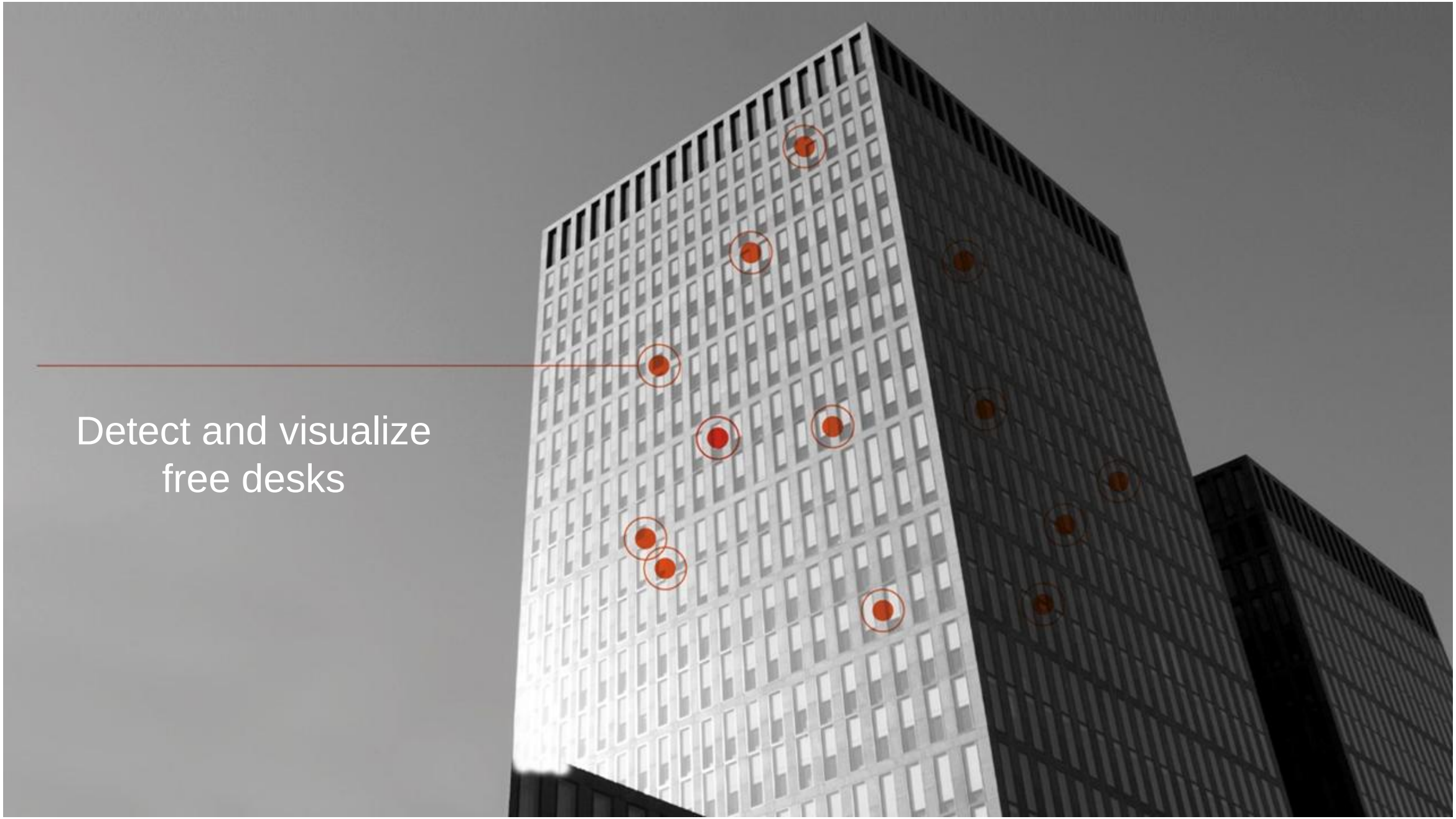
→ Space efficiency

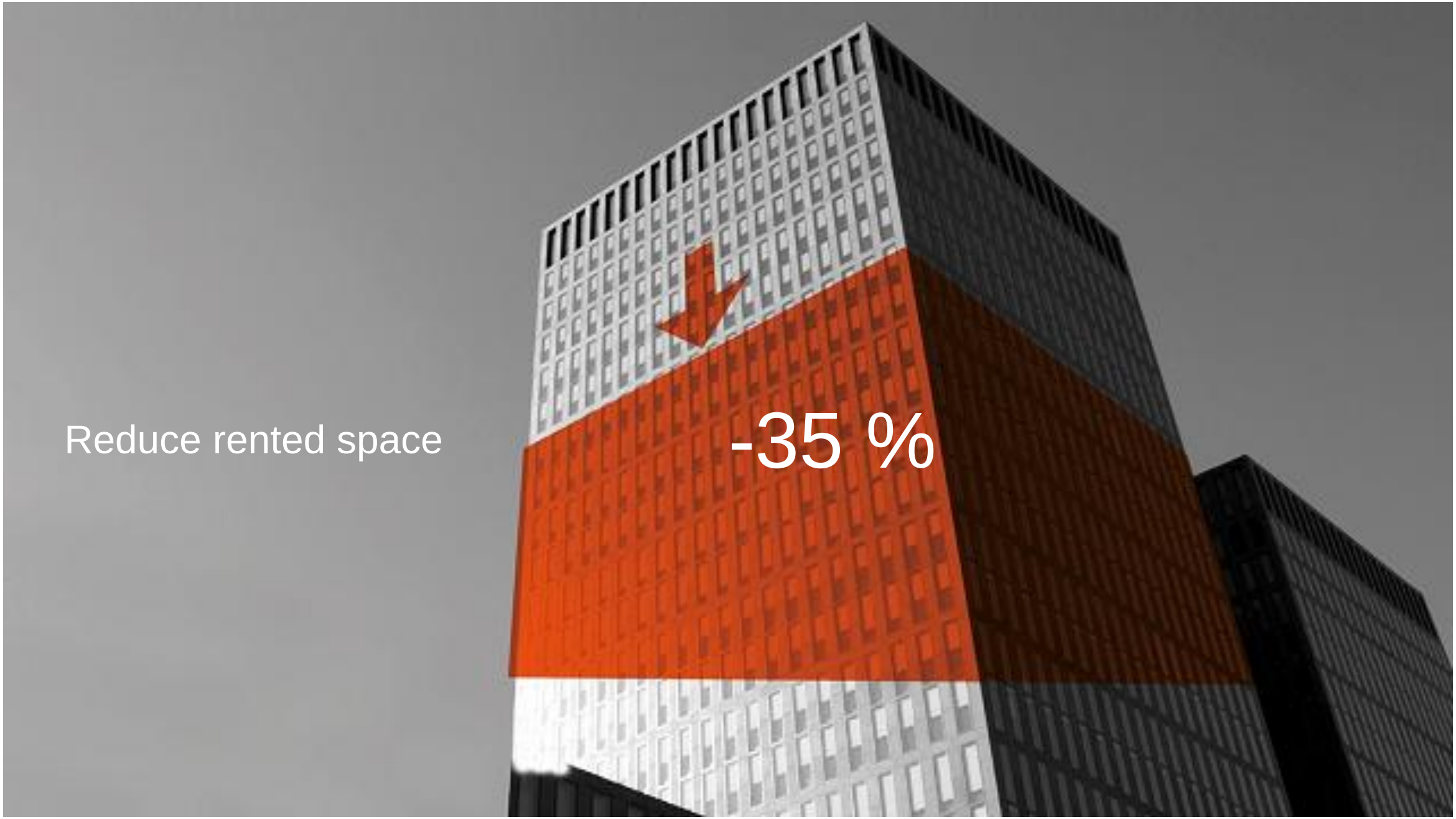
# Typical office occupation

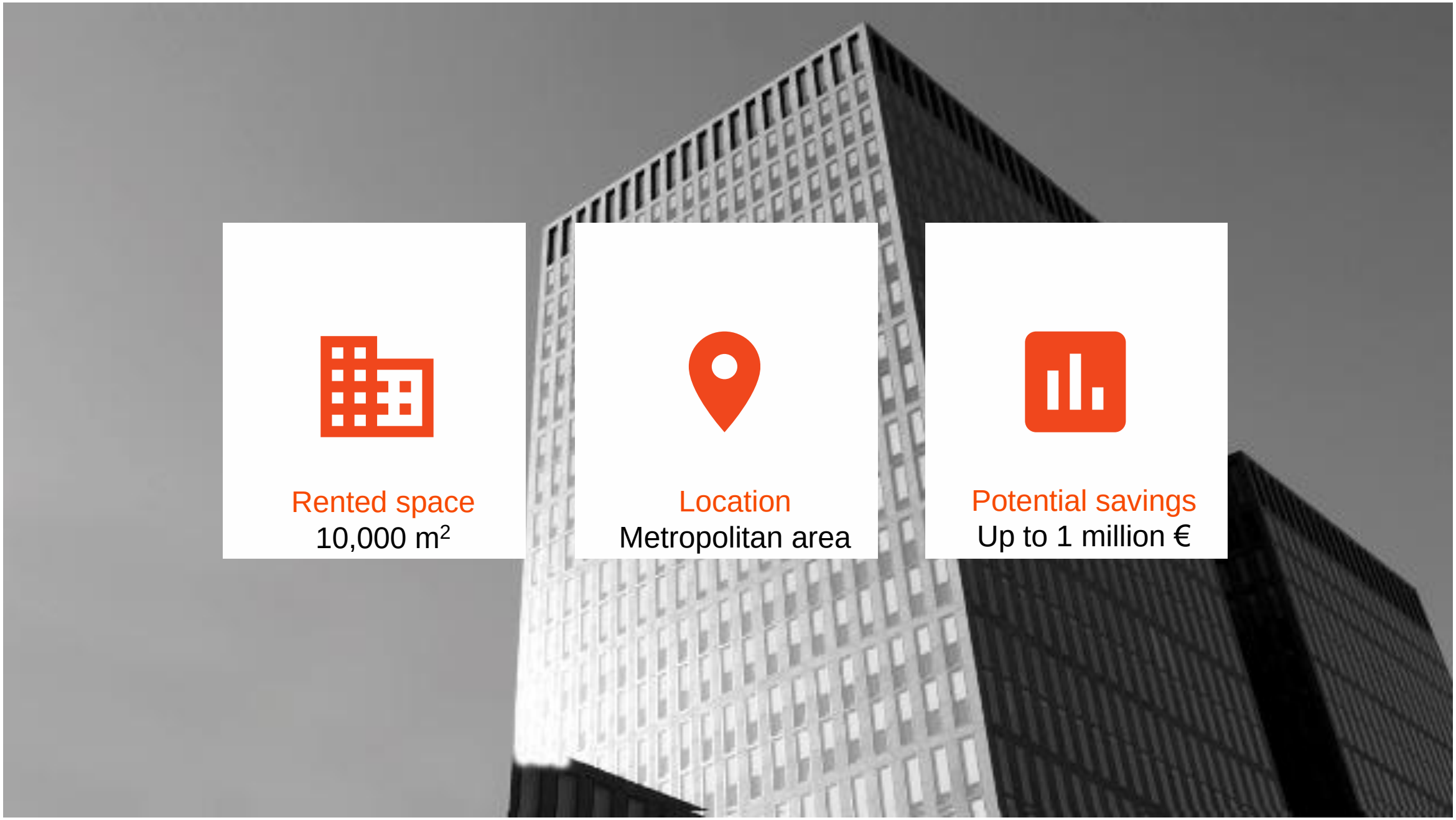

**Smart buildings should enable smart working**

**Needs today:** **55 %** of employees are classified as mobile workforce

**50 %** is the average utilization of office space


Detect and visualize
free desks


Reduce rented space
-35 %


Rented space
10,000 m2
Location
Metropolitan area
Potential savings
Up to 1 million €

# Encelium™ wireless system offers the solution

## Lighting sensors and cloud technology can identify underused real estate

### Solution setup

**1 HW, sensors and connectivity**

- Ceiling presence detectors
- Connectivity and platform gateway
- Under-desk presence detectors

**2 Cloud-based KPI dashboard**

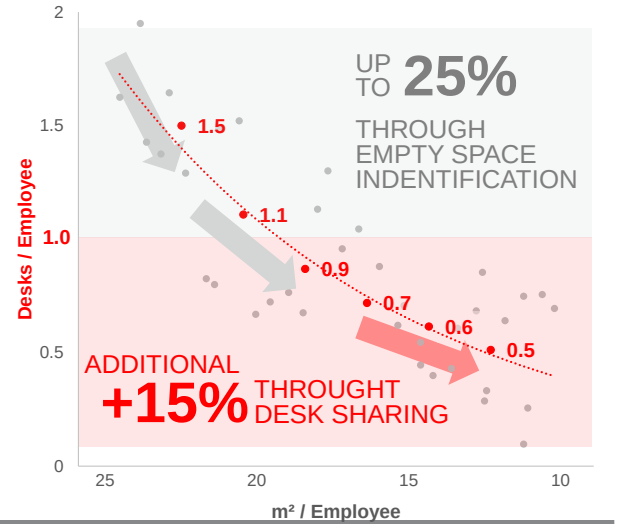
- Real-estate portfolio overview
- Utilization heat map
- KPI tracking dashboard

**3 Services**

Design → Technical installation → Commissioning → Operation training → Operation → Maintenance and support

### Value proposition

- **Real estate cost reduction**
  - Identification of unused/under utilized space
  - Savings from rental space reduction
- **Employee productivity increase**
  - Desk sharing
  - Identification of free space
  - Release of book seats in case of no show



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# Extracting more value in Smart Buildings

## Example 2: focus on 300

What if ...

... you could use smart lighting to control light
but also to enhance the shopping experience?

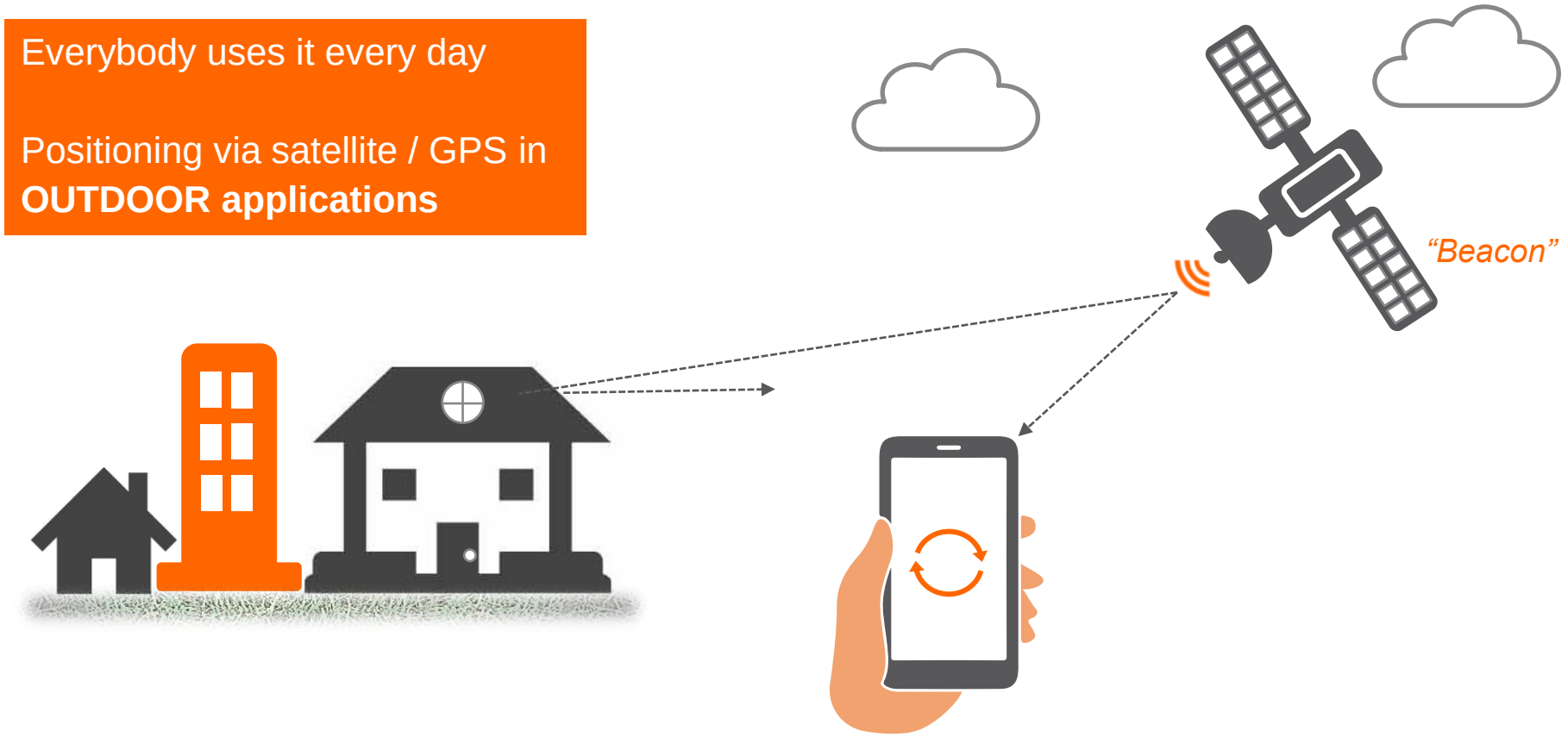
→ Personal efficiency

# Create indoor beacons using the lighting installation

## Integration of Bluetooth beacons enables new use cases

Everybody uses it every day

Positioning via satellite / GPS in **OUTDOOR applications**



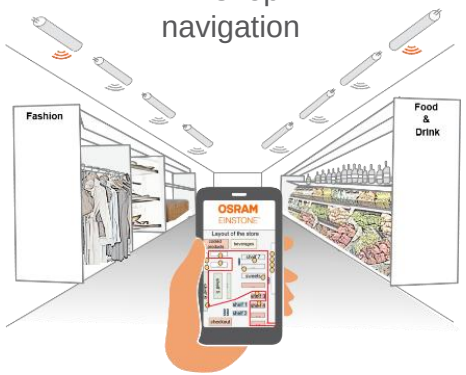

**GPS does not really work indoor (accuracy, shielding, …)**

# EINSTONE™ system offers the solution

## Benefit of beacon in lighting installation: no battery, always ON, easy App integration

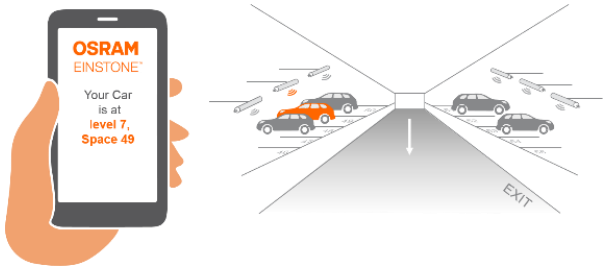
### Use cases:

In shop navigation

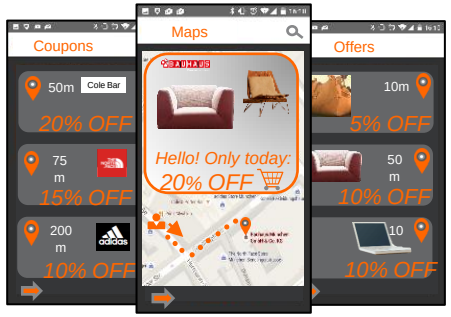



Location based information


Parking navigation




Proximity marketing & Loyalty

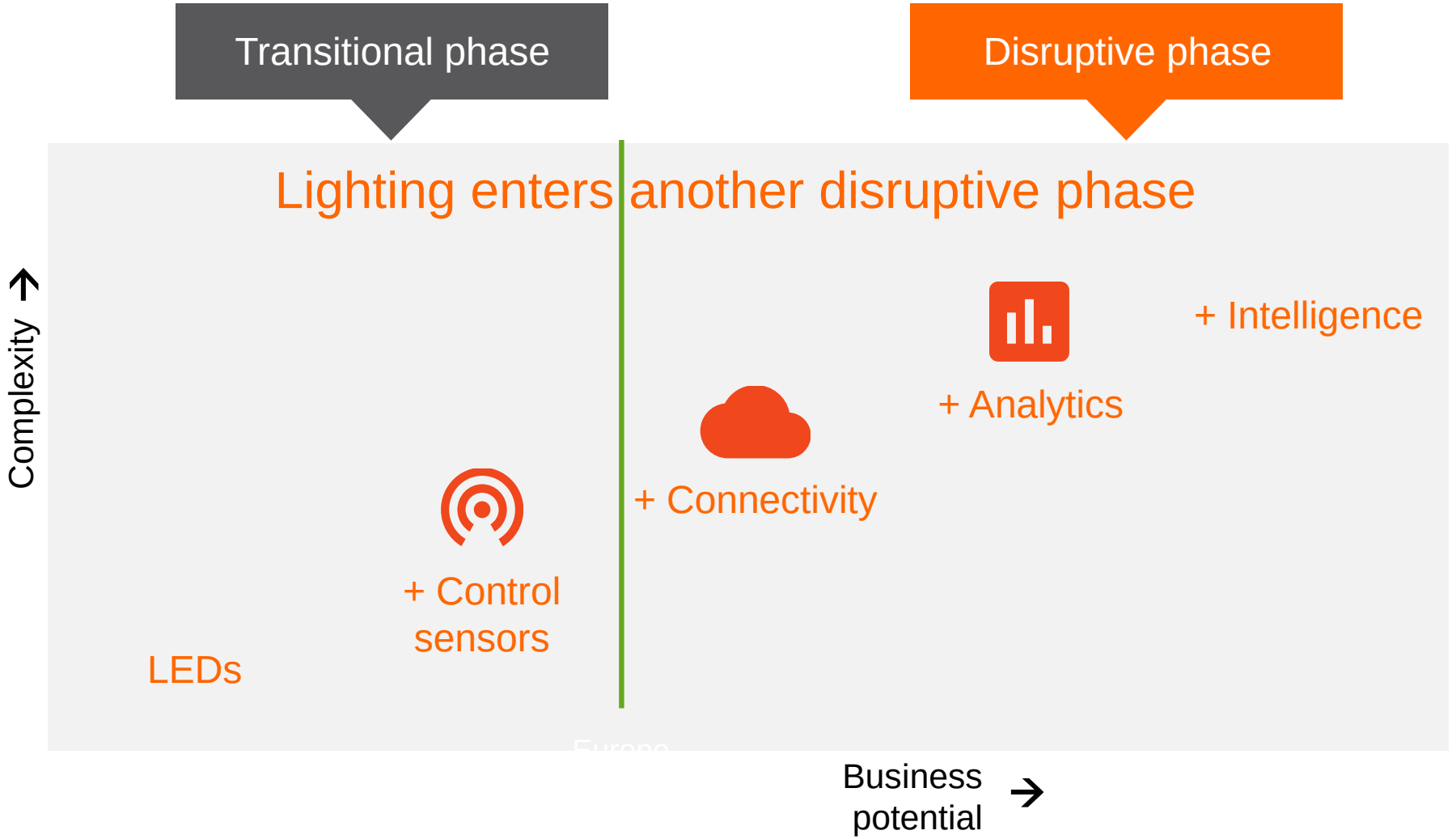



### Device solutions:

- In signage / posterbox
- In fixture using LED driver
- In LED lamp (T8)


# Conclusion: Valuestreams beyond Energy Saving are possible

Clear Smart Building Use Cases show monetization at 3, 30, and 300 level !!



# Thank you.

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