Dall’efficienza energetica alla decarbonizzazione in edilizia

Relatore
Stefano Bergamino

Building intelligence with light: l’illuminazione come asset strategico per la gestione, l’ottimizzazione e l’efficientamento degli edifici commerciali
Going beyond illumination

We are leading the ongoing development of connected lighting systems and services. By leveraging the Internet of Things, we are transforming buildings, urban places, and homes. We increase energy efficiency and manage working environments in a more environmentally friendly way.

We make cities safer and more responsive. We offer rich lighting experiences that make people feel safe, comfortable, focused, energized, and entertained. That’s how we take light beyond illumination, and help improve the way the world works and people live.
Our world is changing

**Population growth and urbanization**

The United Nations predicts the world’s population will grow by 2.5 billion people between 2014 and 2050: 80% of the world’s population will live in cities.

**Resource challenges**

More demand for more efficient solutions

**Digitization**

Drives the need for digital, connected light and applications beyond illumination
Today’s global office trends

• Demand for smart buildings and a move towards cognitive buildings

• Pressure for carbon neutral buildings

• Use of big data/analytics to improve workplace experience

• Strong focus on employee well-being, engagement and choice

• Desire for more adaptable workspaces from an increasingly diverse workforce

• A new generation of employees: millennials will make up around 50% of the workforce by 2020

• Increase in remote and flexible working

• Offices act as a marketing tool in the ‘war for talent’
Understanding the challenges of the modern office

- <50% of space is utilized in many office buildings
- €12,400 average annual cost per desk in Paris
- 70% of people take 15 minutes to find available space to meet
- 20-50% of meeting rooms booked out are not being used at any one time
$17 trillion. That’s the amount business could save if they refurbed their offices to the most efficient and smart standards available today.

$243 billion. That’s how much European businesses could save in reduced rental costs alone if their office buildings were refurbed to the most efficient standards.

All buildings must be net zero by 2050 to achieve climate mitigation goals.
**Ask yourself: what’s light for?**

We need light to see. It’s the reason artificial light was developed in the first place.

But today, light can help us see more than what’s in front of us. Light is insight.

That’s why your lighting infrastructure is the perfect backbone to support your smart building. Lighting is ubiquitous, meaning it can help your business truly see what’s happening across the entire building.
Four features that make healthier and greener offices

**Indoor air quality and ventilation**
Low concentration of CO₂, volatile organic compounds (VOCs), combined with other pollutants, and high ventilation rates.

**101% increase in cognitive scores for workers in a well ventilated offices.**¹

**Thermal comfort**
A comfortable temperature range that staff can control.

**6% drop in staff performance when offices are too hot – and 4% when too cold.**²

**Daylight and lighting**
Generous access to daylight and self-controlled electrical lighting.

**46 minutes more of sleep for office workers sitting near windows.**³

**Noise and acoustics**
Use of materials that reduce noise and provide quiet spaces to work.

**66% fall in staff performance when there is distracting noise.**⁴

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¹ 101% increase in cognitive scores for workers in a well ventilated offices.
² 6% drop in staff performance when offices are too hot – and 4% when too cold.
³ 46 minutes more of sleep for office workers sitting near windows.
⁴ 66% fall in staff performance when there is distracting noise.
Building intelligence with light

**Lighting management**
- Central control panel
- Scheduling
- Light control API

**Lighting asset management**
- Maintenance information
- Alarms and diagnostics plus API
- Automatic notifications
- Automated emergency testing

**Energy optimization**
- Automatic lighting behavior
- Daylight harvesting
- Energy dashboard and reports
- Energy analytics Integration option with HVAC/BMS
- API for energy data

**Scene management**
- Fully customizable scenes and behaviours
- Smartphone personal control app using visible light communication
- Web-based control for tenants
- Light control API based on scenes

**Space management**
- Occupancy dashboard
- Occupancy reports
- API for occupancy data
- People-counting data
- Space management app

**Indoor navigation**
- Personal control based on visible light communication
- Indoor positioning SDK for third-party app integration
- Indoor navigation app (Kiosk)

**Bio-adaptive lighting**
- Tunable white technology
- Programming day rhythms
- Activity focused light recipes

**Environmental monitoring**
- Temperature/humidity monitoring
- API for integration with HVAC/BMS
Environmental monitoring

- Collect data on temperature and humidity levels in the office via sensors embedded in the connected lighting system
- Ensure the optimal office environment to keep employees healthy, comfortable and productive

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**Temperature**

- >2 m (6.6 ft)

**Humidity**

- >30 cm (11.8 in)

**HVAC**

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LRV1660 in LCA8008

Design-in guide
Tunable white – relation to WELL building standard

• The WELL building standard is an up-and-coming certification that focuses on health and wellbeing of occupants.

• The standard contains a chapter on light and one of the requirements relates to ‘circadian lighting design’. It is important to have enough ‘melanopic light intensity' during the day to trigger the body’s circadian system, which improves the sleep-wake cycle.

• With traditional light at 3000 or 4000K this requires much higher light levels than 300-500 lux typically required. Light at 5000K or higher is a lot more efficient to provide the required ‘melanopic light intensity’ (more blue light) and can provide this at lower overall lux levels.

• Because it is very unpleasant to be exposed to 5000K for the entire day, a day rhythm - in combination with Tunable White - is an ideal solution.
Benefits of using the mobile app

- Improve employee engagement with their work environment
- Cultivate a satisfied, productive workforce
- Provide tools to enhance employees’ efficiency and productivity
- Strengthen your brand by showing that your business puts employees in control of their environment

Employee app for maximizing their time in the office

- Digital floorplan with search option
- Real-time occupancy information
- Book of desks and meeting rooms
- Ability to locate facilities, colleagues, spaces
- Dynamic Indoor navigation based on Signify’s Indoor Positioning System
- Option to share ‘live’ location with colleagues
- White labelling option
- Light control
Space management

- Capture and analyze building occupancy data to learn how an office space is occupied and used over time
- Use insights to create a workspace that truly meets the needs of your business
- Lower real-estate costs without compromising workplace efficiency and employee engagement
• Provide occupancy transparency across entire portfolio
• Understand how and what for your office is being used to reallocate space where and when needed
• Plan for future needs
• Access on-demand reports on space usage
• Drive strategic decisions based on data rather than assumptions
Life on the cutting edge  
The Edge, Amsterdam, The Netherlands

### The vision
The Edge is an innovative, multi-tenant office building in the Zuidas business district in Amsterdam. The main design goal was to create an intuitive, comfortable and productive environment for employees, that could serve as inspiration for sustainable building design around the world.

### The solution
Working closely with a Dutch real-estate business and the lead tenant Deloitte, we delivered a connected lighting system using cutting-edge IoT technologies. This enables data collection and insight over customized software applications, which continue to enhance the flexibility of the open-plan office. Since moving to the Edge, Deloitte have seen a fourfold increase in applications for job vacancies.

<table>
<thead>
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<th>Deloitte building</th>
<th>Allocated m²</th>
<th># employees</th>
<th>Euro/m²</th>
<th>M²/FTE</th>
<th>Cost/employee</th>
<th>Savings</th>
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<tbody>
<tr>
<td>Chrystal Tower (Previous Deloitte premises)</td>
<td>24,500</td>
<td>1600</td>
<td>260</td>
<td>15,3</td>
<td>€3981</td>
<td>-</td>
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<tr>
<td>The Edge Nov. 2014</td>
<td>20,000</td>
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<td>360</td>
<td>11,5</td>
<td>€4137</td>
<td>€0,23 m</td>
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<tr>
<td>The Edge Sept. 2016</td>
<td>20,000</td>
<td>2700+</td>
<td>360</td>
<td>7,4</td>
<td>€2666</td>
<td>€4m comparable housing cost / annum</td>
</tr>
</tbody>
</table>

6,500 connected LED luminaires and 3,000 sensors over 40,000 m²

Lowered annual cost of space per employee by over €1,800 compared to their original offices

Awarded BREEAM Outstanding green building certification

interact
Grazie per l’attenzione.

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