PHILIPS

Professional lighting

Power over Ethernet

Be future ready

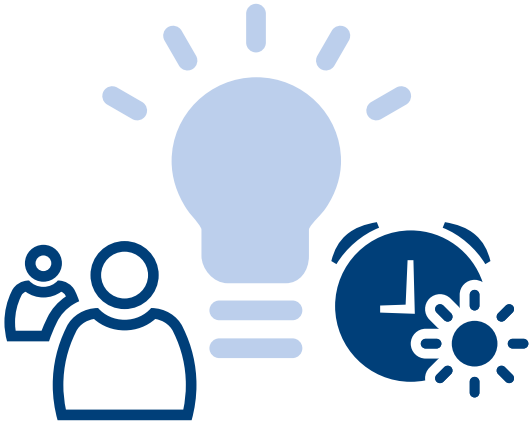
with connected lighting

We are always connected

How the Internet has changed everything

The shift from analog to digital has completely changed our world in the last 30 years. We walk around with smartphones that contain more computing power than that which helped Neil Armstrong set foot on the moon in 1969. Technology is a personal tool that can help us stay connected with people and organisations, wherever they are.

With Philips, light is no longer just what you think it is.



Taking light beyond illumination. Now it's also a channel to transmit information.

- Waking us up from our slumber
- Lighting up our paths
- Ability to detect our arrival
- Managing properties
- Providing personalised lighting controls
- Knowing our preferences and presenting us with the right products
- Giving an overview and providing efficient solutions

Connectivity—communication and data through lighting

Connected lighting systems offer digital ceiling infrastructure that provides high-quality, reliable illumination as well as a smart, high-bandwidth communications platform that delivers extraordinary value beyond illumination.

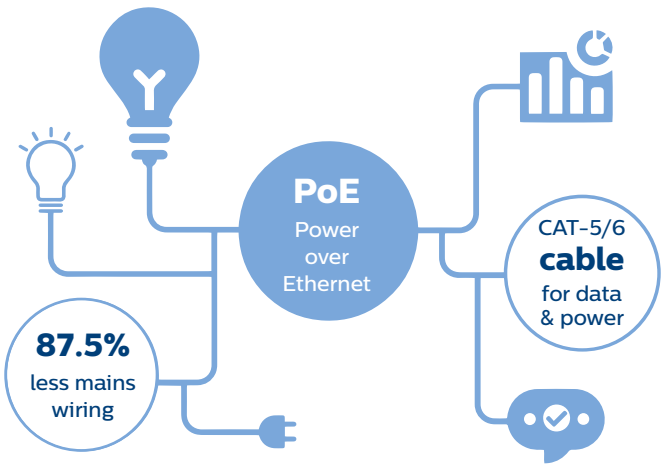
Information collected through a connected lighting system offers deeper insight into building usage and greater control over the distribution and consumption of resources. Building owners and managers can then reap savings from optimising lighting and other building verticals, such as HVAC.

Smart, connected system that enables light to go beyond illumination

Philips PoE smart, connected lighting system is the world's first disruptive and innovative smart office lighting system. It can integrate with other systems in a building or city to creating new synergies and efficiencies, and make lighting an integral part of the new digital ecology.

Making use of the existing network, it turns every luminaire into a node in the basic network that can be used to collect all sorts of data, to create a platform for the Internet of Things and unleashing unlimited potential in its applications.

With Power over Ethernet, both power and data can be transmitted over just one cable to cater to the needs of the lighting and control system.



5 advantages of a PoE smart office

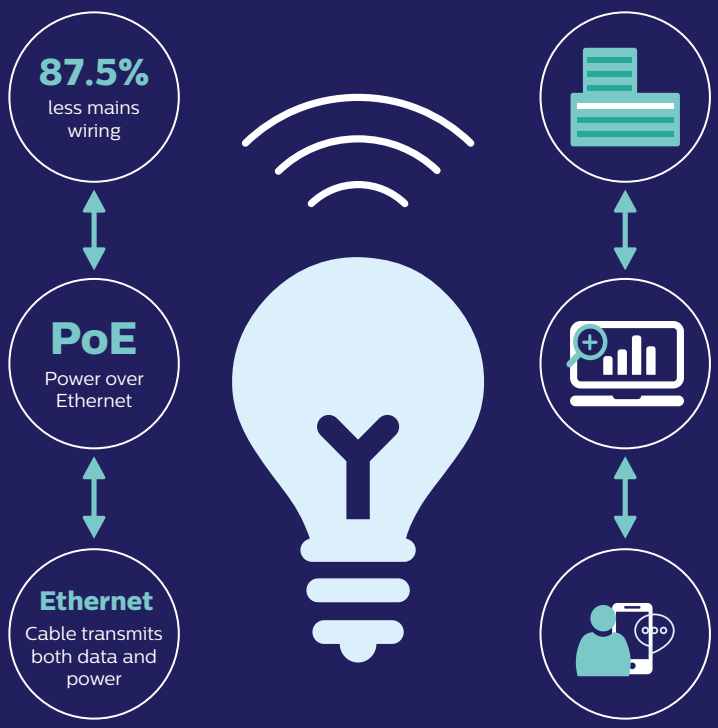
1 **Future-proof smart technology**
With a digital ceiling infrastructure

2 **Increase management efficiency**
Collect data through built-in sensors in luminaires

3 **Increase productivity**
Innovative light coding technology capable of indoor navigation

4 **Comfort and control**
Personalised control through mobile apps

5 **Green and energy saving**
Through LED lights with high optical efficiency, control system and energy management



How it works

In a connected lighting system, every luminaire is directly connected to and uniquely identified within a building's IT network, allowing system managers to monitor, manage and maintain individual light points via lighting management software.

With integrated sensors, connected luminaires become points of intelligence that share data on occupancy, activity patterns, and changes in temperature and daylight levels.

The wireless communications also allows for connected luminaires to deliver location-based services and in-context information to people in illuminated spaces.

1 Future-proof smart technology

With a digital ceiling infrastructure

Ability to cater to future information needs

Able to increase the number of sensors to collect all kinds of information

Ability to cater to future changes in office space

Shared facilities with Ethernet, no rewiring needed, providing flexibility for future changes

Ability to cater to future telecommunications needs

Able to add on beacons such as Bluetooth or Wifi to cater to diverse telecommunications needs

Ability to cater to future needs in data services

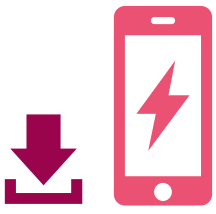
Able to provide timely upgrades through software and hardware updates, as well as system integration

2 Increase management efficiency

Collect data through built-in sensors in luminaires

Office management

Provide big data analysis on staff and department activities; help policy making; optimise workspace utilisation; allows for efficient allocation and maintenance of resources



Simple to install and adjust

Low voltage and safe

Facilities management

Transmit information on lighting condition, reminders on light breakdown, identify faulty points, integration with work dispatch system

Security

Track unauthorised entry, replacing the need for traditional patrol

3 Increase productivity

Innovative light coding technology capable of indoor navigation

Positioning

Luminaire can be scanned to identify staff position in the office building

Navigation

Mobile phones provide route navigation to help staff or visitors locate meeting or office cluster, as well as mobile work stations

4 Comfort and control

Personalised control through mobile apps

Lighting in offices has a profound effect on workers' well-being and vitality, influencing daily productivity. Connected lighting offers individual, personalised control of environments, creating a much more pleasant and comfortable workplace.

Integration with office systems

When integrated with office systems such as Outlook and Lotus Notes, facilities in a meeting room such as lights, air-conditioning and projectors can automatically be switched to the meeting mode prior to a meeting

Ability to integrate with third-party devices

Third-party devices / systems can be integrated with our system becoming part of a "smart building" app

Easy to control

Employees are in control of their working environment with customisable lighting brightness and temperature

Multi-purpose app

Besides serving as a control, the app can also transmit data and service the employee

Reduce cabling

The 3 in 1 cable serves as phone lines, internet cable and power cable all at once, providing a neat and comfortable work environment

5 Green and energy saving

Through LED lights with high optical efficiency, control system and energy management

Smart control system

Common spaces in office buildings are often empty. Using human body sensors, light intensity can be increased with human presence and decrease in the absence of humans, providing energy savings.

Energy management

Using a central computerised energy control software, energy usage data can be collated, analysed, monitored and compiled into a report.

It allows for Integration of lighting and other building automation systems, such as air-conditioning, curtains, security etc.

Through real time updates of staff numbers and locations, it can automatically adjust lighting levels, and air-conditioning temperatures, saving time, money and energy.

When integrated with office systems such as Outlook and Lotus Note, lights and air-conditioning can be turned off automatically after a meeting to prevent energy wastage.

Connected lighting thus supports businesses who wish to achieve the highest green building certification ratings and maximum energy savings.

LED with high optical efficiency

Philips PowerBalance LED and LuxSpace III are highly energy efficient with great visual comfort, providing over 65% energy savings compared to traditional luminaire.

- Creates an adaptive environment that can sense, anticipate and respond to specific needs of users, leading to energy savings
- Reduce installation costs in new buildings by up to 50%
- Innovative commissioning method that reduces initial set up time and provides ease in making changes in the future
- Able to future proof buildings through the ability to add sensors and locator beacons

80% energy savings

LuxSpace III

Sustainable lighting solutions with high energy efficiency and visual comfort. Attained more than 100lm/w optical efficiency, provides 80% energy savings over traditional CFL light tubes.

65% energy savings

PowerBalance LED

1st LED light to attain 130lm/w optical efficiency whilst maintaining luminosity standards. System efficiency at over 115lm/w and up to 65% energy savings compared to T8 system.

BREEAM

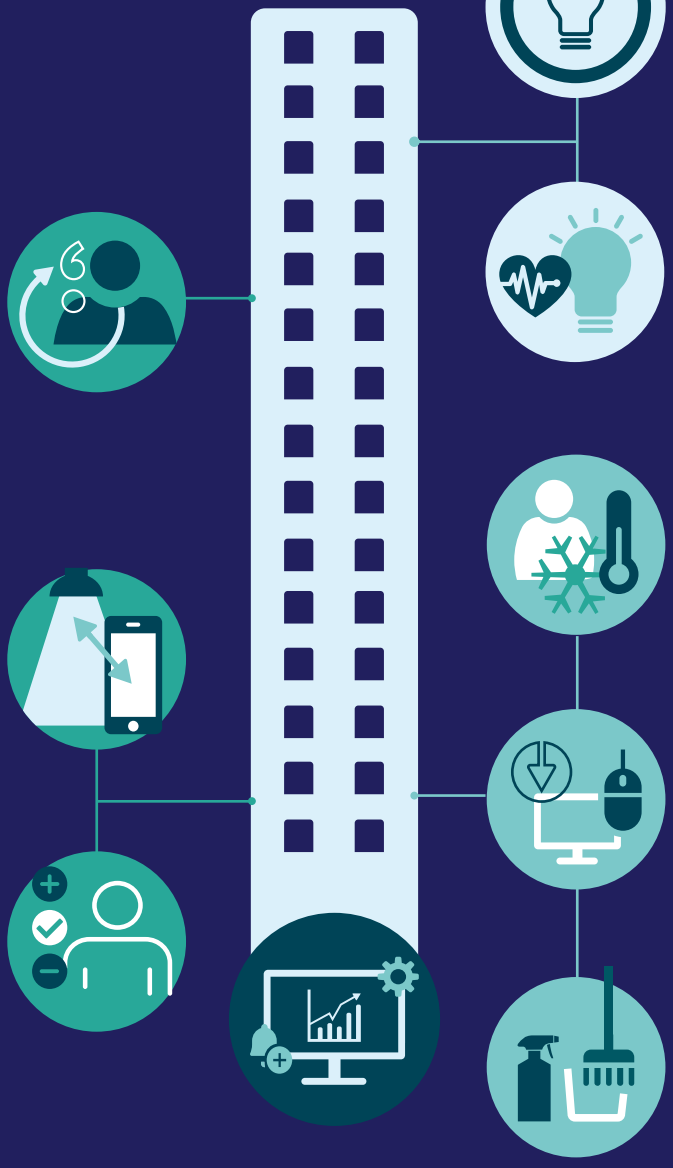
Certification for sustainable green buildings

There is increasing demand to reduce a building's impact on the environment and many organisations have launched certifications for green buildings. They include the Leadership in Energy and Environmental Design (LEED) certification developed by the U.S. Green Building Council and the Building Research Establishment Environmental Assessment Methodology (BREEAM) certification by UK based Building Research Establishment (BRE). LEED and BREEAM are now globally recognised standards.

According to LEED NC 2013 standards, the highest score possible in relation to luminosity control is 30-40 points.

LEED certification thresholds: Platinum 80-100 points, Gold 60-79 points, Silver 50-59 points, Certified 40-49 points.

What connected lighting can do for you



Up to

80%

Energy saving for lighting alone*

through the connected lighting system compared to traditional lighting

Quality of light, health and wellbeing

Lighting in offices has a profound effect on employees' well-being, therefore the quality of light and the correct light for every task area is extremely important

Human resources benefits

A more appealing environment creates higher attraction and retention levels of professionals within enteprises

Savings from building verticals

Energy from lighting and other building sub-systems, e.g. heating and cooling are reduced in unoccupied areas

Improving productivity with location based services

Visible light communication (VLC) within the connected lighting system provides insights to the availability of nearby facilities such as meeting rooms

$5 per ft² per year**

Savings on rental space

Provides highly detailed data occupancy insights and trends to aid space utilisation, reducing required floor space by 11%

Personalisation via mobile apps

Individuals can adjust the lighting levels and temperature, creating a more comfortable and productive workspace

$8 per 100 ft² per year**

Reduced cleaning cost

By analysing occupancy data, only spaces that have been in use are cleaned, saving resources and costs

Central management

Remotely and centrally monitor and manage all connected light points, energy consumption, and occupancy data via software

* Combined savings from LED lighting, occupancy sensor, daylight harvesting, personal controls and control of Variable-Air-Volume HVAC installations. (Source: J. Zhang, R.G. Lutes, G. Liu, M.R. Brambley. Energy Savings for Occupancy-Based Control (OBC) of Variable-Air-Volume (VAV) Systems, January 2013).

** Percentage range of savings: 11-67%; average rent price of $48.62/ft²/year based on Q3 2015 office market outlook by Colliers International

*** Source: International Facility Management Association, Benchmarks V report#30, 2008; based on $1.62/ft² inflation adjusted cleaning cost

The Edge—an inspiration for sustainable building design

The Edge is a multi-tenant office building in Amsterdam. Opened in 2015, it received an outstanding score of 98.36%—the highest ever awarded—from BREEAM, the world's leading design and assessment method for sustainable buildings.

How it was done

OVG and Deloitte worked closely with Philips Lighting to deliver a connected lighting system that uses cutting-edge technologies to enhance the flexibility of the open-plan office. It not only allows employees to personalise the lighting and temperature at their workspaces using a smartphone app, but also provides real-time data on operations and activities. This data helps facility managers maximise operational efficiency as well as reduce the building's CO_2 footprint.

Life under a digital ceiling

The system uses nearly 6,500 connected LED luminaires to create a 'digital ceiling' across the building's 15 storeys. 3,000 of these luminaires has sensors that work with Philips Envision lighting management software, the system that captures, stores, shares and distributes information throughout the illuminated space. Facility managers use the software to visualise and analyse this data, track energy consumption and streamline maintenance operations. The system uses 750 Power-over-Ethernet (PoE) switches are used to connect lighting fixtures to the building's IT network.

The integrated sensors capture anonymous data on room occupancy, temperature, and humidity, which are used to precisely deliver lighting, heating, cooling and cleaning resources with maximum energy efficiency. Light levels, heating, cooling and cleaning are reduced in low-occupancy areas to save time, money and energy.

What it means

Individual employees can use the system to create a personal space. For example, the connected luminaires use visible light communications (VLC) to offer services to employees in the illuminated space. VLC sends a code via the LED light beam and the employee's smartphone camera receives this code, registering his or her location. With an iPhone app designed for The Edge, the employee can control the lighting above a specific desk, even in an open plan office. Employees also use the app to adjust the lighting and temperature in meeting rooms. The connected lighting system also enables employees to locate colleagues, check on room availability and navigate from place to place.

LED lighting is also known for its low power consumption, so energy savings were built in from day one. The expected savings are €100,000 in energy costs and €1.5 million in space utilisation costs.

The last word...

The Philips connected lighting system at The Edge is the world's first fully-realised system of its kind.

By communicating and interacting with the environment, office life becomes an immersive experience. With the ability to highly personalise work spaces, employees find the building a more inviting place to work in.

The system demonstrates worldwide leadership in sustainable practices and human-centric working environments, a vision shared by OVG, Deloitte and Philips.

Connected lighting at The Edge—the numbers

6,500
luminaires over 15 floors

3,000
luminaires with integrated sensors

750
PoE switches to provide connectivity and power

€100,000/ $115,000
expected annual savings in energy bills

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