Smart, Connected and Secure Lighting

Serving Clients with Smart, Connected and Secure Embedded Solutions

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Overview

- Lighting today
- Microchip in Lighting
- Lighting trends and markets

Lighting Today

- The lighting industry has moved to Solid State Lighting
- Efficiency improvement has slow down (>205 lm/W today)
- Industry is now focussed on Smart lighting – the next disruptive transition.
- Lighting infrastructure to become the backbone of the IoT
- Smart Street Light Market to be worth $28.1B by 2029.
- Lighting to become the digital infrastructure of the building.
- Governments and stakeholders focusing on reducing energy use
- Lighting accounts for 40% of a citie’s energy cost.

Focus areas of Lighting Segment


Retail

Workplace


Hospitality & Leisure


UVC Disinfection


Healthcare


Industrial


Outdoor & Street


Transport


Residential Developments


Emergency Lighting

- Connected Home
- Indoor commercial Lighting
- Outdoor Lighting

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What does the future look like?

- Innovation and Value
- Intelligent control and monitoring
  - Space Management
    - Make better use of meeting rooms and desks – ideal for Flex desk office
    - Meeting rooms used 39% of the time and at only 19% capacity
    - Average occupancy of desks is 60% maximum
  - Cleaning and Security
    - Using data from the lighting system reduces cleaning costs by 15% in a 5500m2 building.
    - High density sensor networks covers the entire building
  - Indoor navigation
    - Nurses spend 1H a day looking for equipment

- Human centric Lighting
  - Circadian rhythm applications
  - Colour temperature tuning
  - Aging work population
  - 90% of our time spent indoors
- Urban Lighting:
  - One Million people moving to cities every week – By 2050 70%
  - Crime prevention – 21% prevention
  - 28-45% of inner city traffic is looking for parking
- Predictive maintenance
- Energy Metering
- Energy savings far beyond LED


HUMAN CENTRIC LIGHTING
1000 2000 3000 4000 5000 6000 7000 8000 9000 10000 K

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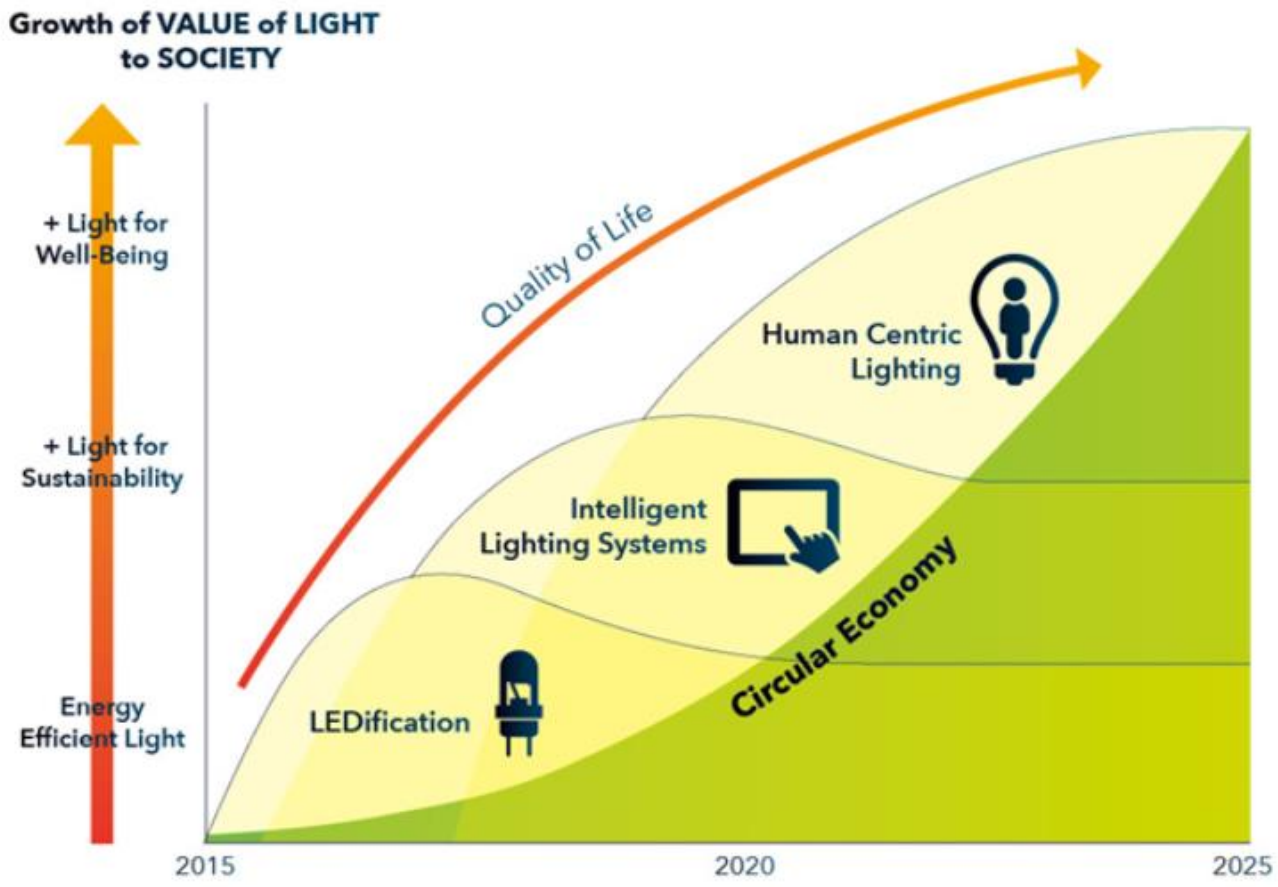
Human Centric Lighting



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Applications

Education

Healthcare

Workplace

Travel & Transportation

Human Centric Lighting

- Human Centric Lighting promo page:
  - https://www.microchip.com/promo/led-drivers-for-human-centric-lighting
  - Demo & proof of concept available

Human Centric Lighting – Our Solution

Demonstrates how to drive and control two different color temperature LED strings via Bluetooth

- Power Supply Block (LDO, DFET)
  - Offline Input Supply Driven
  - Low Iq LDO
- LED Driver Block
  - Average current mode control LED driver
  - Improved accuracy, line and load regulation of the LED current
- Control Block
  - 8-bit Microcontroller for color temp and intensity control
- Communication Block
  - BLE module for seamless data transfer
- Mobile Application
  - User control to connect to the demo board through Bluetooth protocol
- LED Load
  - 30V, 275mA

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Smart City Street Lighting

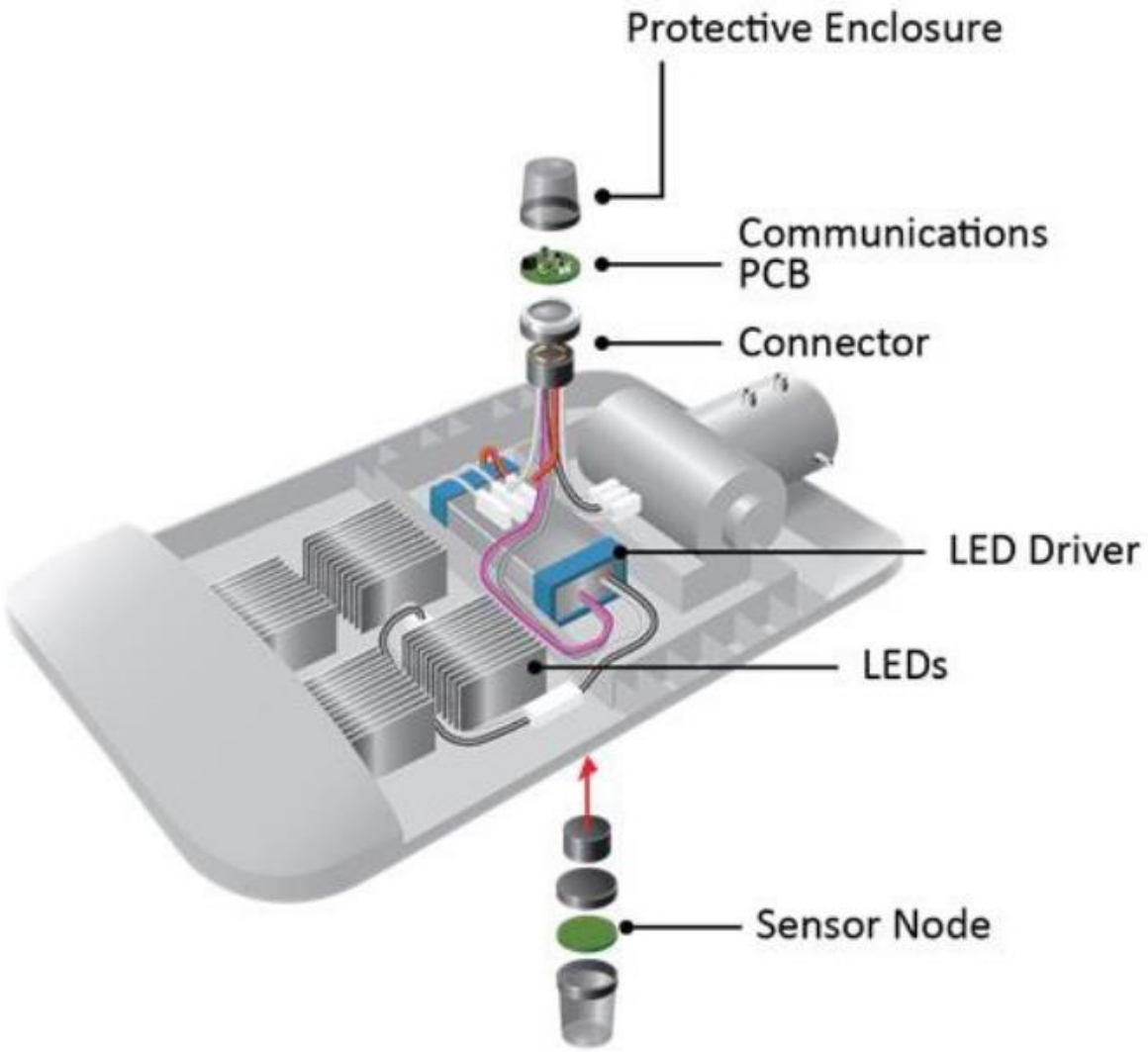
Field of Play:
Smart Connected Street Light

- Current Global Street light install base is 326M units growing to 361M by 2029. 73% will be converted to LED by end of decade.
- Over a quarter of all streetlights globally have been converted to LED
- Over 10m have been connected globally not including China & India.
- Smart street lighting has grown at a robust CAGR of 52% since 2012 and will maintain steady growth through the 2020s
- Overall, LED and smart streetlights are projected to reach 73% and 23% of the total streetlight market, respectiviely, by 2029. This will total a $28.1B market opportunity over the next decade.

Future Communication Standards

- Standardised platform for IOT connectivity in lighting
- Applicable for both indoor and outdoor lighting
- Standardisation provides a constant DC on output from power supply to both luminaire and sensor nodes.
- Intra – luminaire form of wired communication.
- Demonstrating plug – and – play interoperability of luminaires, sensors and communication nodes

Intelligent Street Light Solution Example



Radio Board:
Bi-directional Data Transmission

Intelligent Node:
Interface between radio board & LED Driver
Network & cloud specific

Power Supply
- Digital LED Driver
- Provides constant DC on for sensors

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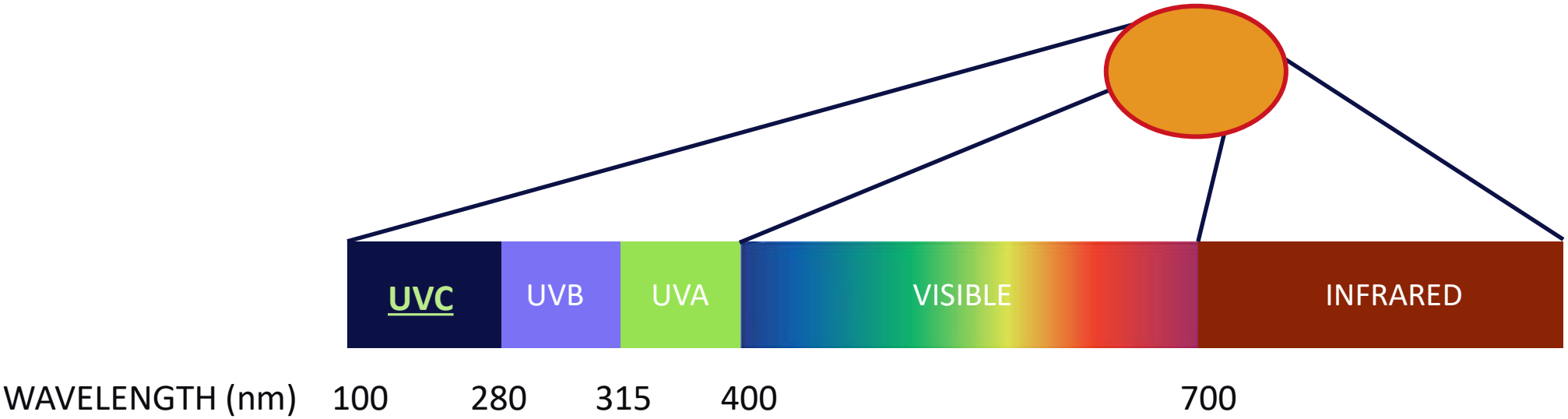
Accelerating the integration of lighting for Smart City

- Move to LED
- Connectivity
- Sensors
- EV Charging
- CCTV
- PoE
- AI/ML
- 5G Picocells
- Predictive Maintenance
- Noise technology
- MicroPNT

Principles of UV Disinfection

- UVA: 315-400nm. Curing, Insect Traps, Suntanning
- UVB: 280-315nm. Medical use e.g. Phototherapy
- UVC: 200-280nm. Disinfection purposes & germicidal applications

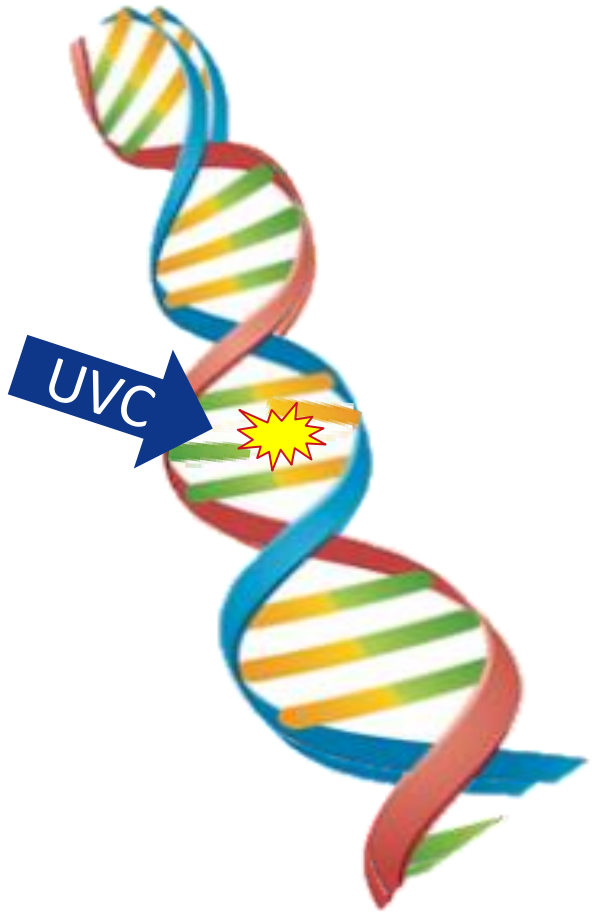
Only UVC has germicidal properties for disinfection



How UV disinfection works

- The UV exposure does not remove organisms from the infected surface or volume, but it inactivates them

- It does that by altering the DNA of the cells and impeding reproduction at the same time



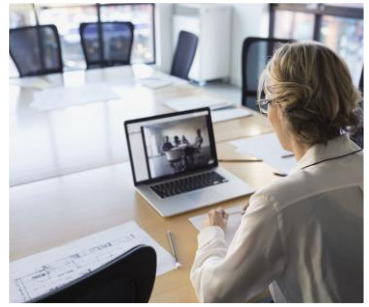
Applications - Overview

Transportation

Food

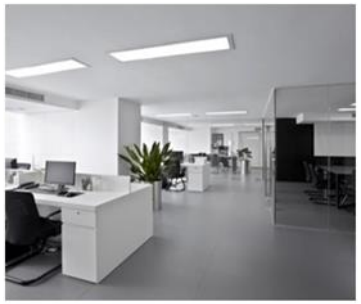
Hospitality

Retail



Work Surfaces

Medical



Offices

Restrooms

Custom Chambers/Cabinets

Entertainment

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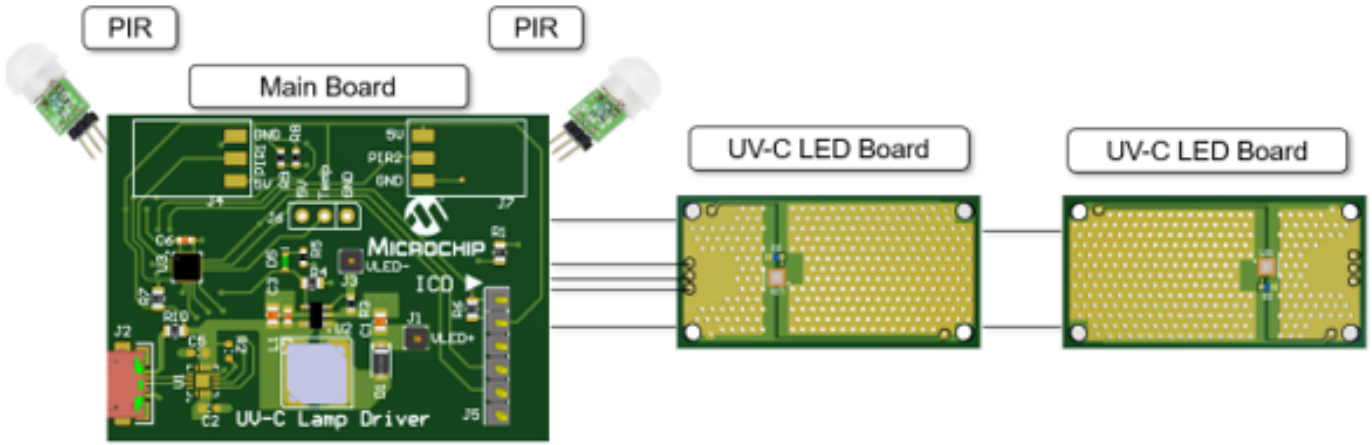
UVC Solution



FEATURES

USB powered: Limited to 2.5W (5V 500mA) so any USB port can drive it (power can be increased)

Easy to use: Single button to start

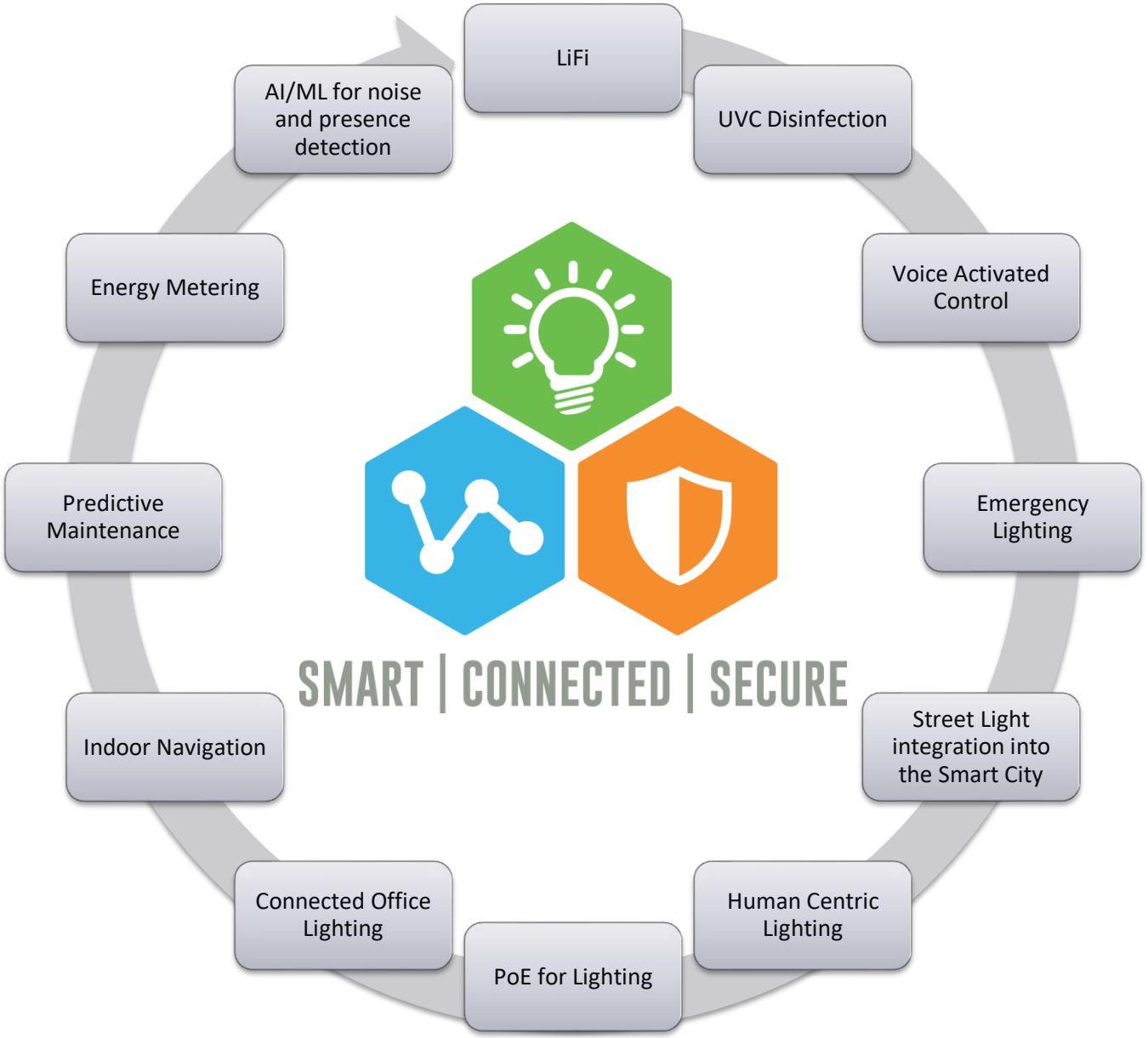
Safe: Blue, Green & Red LEDs indicators to signal the lamp functionality from distance

PIR sensors: To detect proximity and shut down the UV-C LEDs

Delay timers: To ensure the lamp starts well after everyone left the area.

LED Temperature sensor: To prevent any dangerous overheating

Focus Trends and Technologies



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THANK YOU!
Questions?

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