Toward to “Lighting 4.0” era: The “Right Smart Lighting” Challenge

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Today, artificial light is everywhere

**Multiples Usages:**

- Monument Lighting
- Street Lighting
- Indoor Lighting
- Signage & displays
- Vehicles & transport
- Non-lighting Applications

**Multiples Functions:**

- See & be seen
- Locate
- Identify
- Make secure
- Make feel secure
- Communicate
- Appreciate
- Enhance & fancy
- Create ambiance
Some global figures

16.5%
2,900 TWh of annual electricity world-production for generating artificial light

~2%
2% of world annual energy primary resources used

1,150,000,000 metric tons CO₂
5% of the world CO₂ annual emissions = 230 million people CO₂ emissions

30,000,000,000
More than 30 billion electric lamps operate everyday worldwide

40-45%
LED market revenue share

$120,000,000,000
Lighting industry annual turnover US$ 120 billion and still growing.

Artificial lighting has a large impact on energy, environment but also on every day’s life and world’s economy.
The way forward to Lighting 4.0 era

- End 19th c. Electrical Lighting
- Lighting 2.0
- Mid 21st c. Lighting 4.0
- Earl 21st c. Lighting 3.5
- End 20th c. Lighting 3.0

Smart Buildings

IoT

Smart Lighting

Smart Cities

Smart Grids

Human Centric Lighting

Energy Efficient Lighting

Connected Lighting

Light-up

Human Factors

Technology

Sensing

Connecting

Digitalization
Transformative characteristics of smart lighting

- Human-centric Smart Lighting systems in buildings can produce the “right light” in quality and quality when and where it is needed, reducing that way useless energy consumption and providing the best lighting conditions for high visual performance and high comfort for the end-user adapted to a task.

- A connected lighting system can be used as basis for connecting communicating objects thanks to visual light communication (VLC) and LiFi functionalities. Objects can communicate between them or/and a central system. VLC/LiFi offer a large band-pass to allow large data flows. A lighting network forms a dense mesh that can be used s for various applications & services

- Illumination will become a sub-function of a more complex ICT (Information Communication Technology) system, which will be a sub-system in the Internet-of-Things (IoT) global system. Light will be the vector of new services and carrier of dataflows that will spawn additional products

- In smart cities, so-called smart urban objects can be used in public areas to increase the sense of security of people. Safety in everyday life is improved by overcoming barriers such as dark areas at night without being in obligation to squander energy for illuminating empty spaces. For instance elder people, which can enhance their participation in public life. Connected smart lighting poles can recognize social alarms, hazardous citations, accidents and broadcast information to vulnerable public space users (i.e. elder or disable people).
Smart Lighting Technology status - the Hype Cycle

- Human-centric Lighting
- IoT technologies
- Connected Lighting
- OLED Technology
- LED Technology
- ICT technology
- Smart Lighting
- LiFi/VLCs
- Laser lighting Technology
- Sensors Technology
The ultimate solution: the “right human-centric smart lighting” concept

Illuminate" doesn’t mean "flood" objects, people or buildings with light!

- Light-up smart, where it is needed, when it is necessary and as best as possible!

Smart Lighting development contributes to several grand challenges
- Contribute to Energy savings
- Contribute to Lighting and IT industry rise
- Contribute to Healthy working environments and high task performance
- Contribute to the Silver Economy
Thank you!