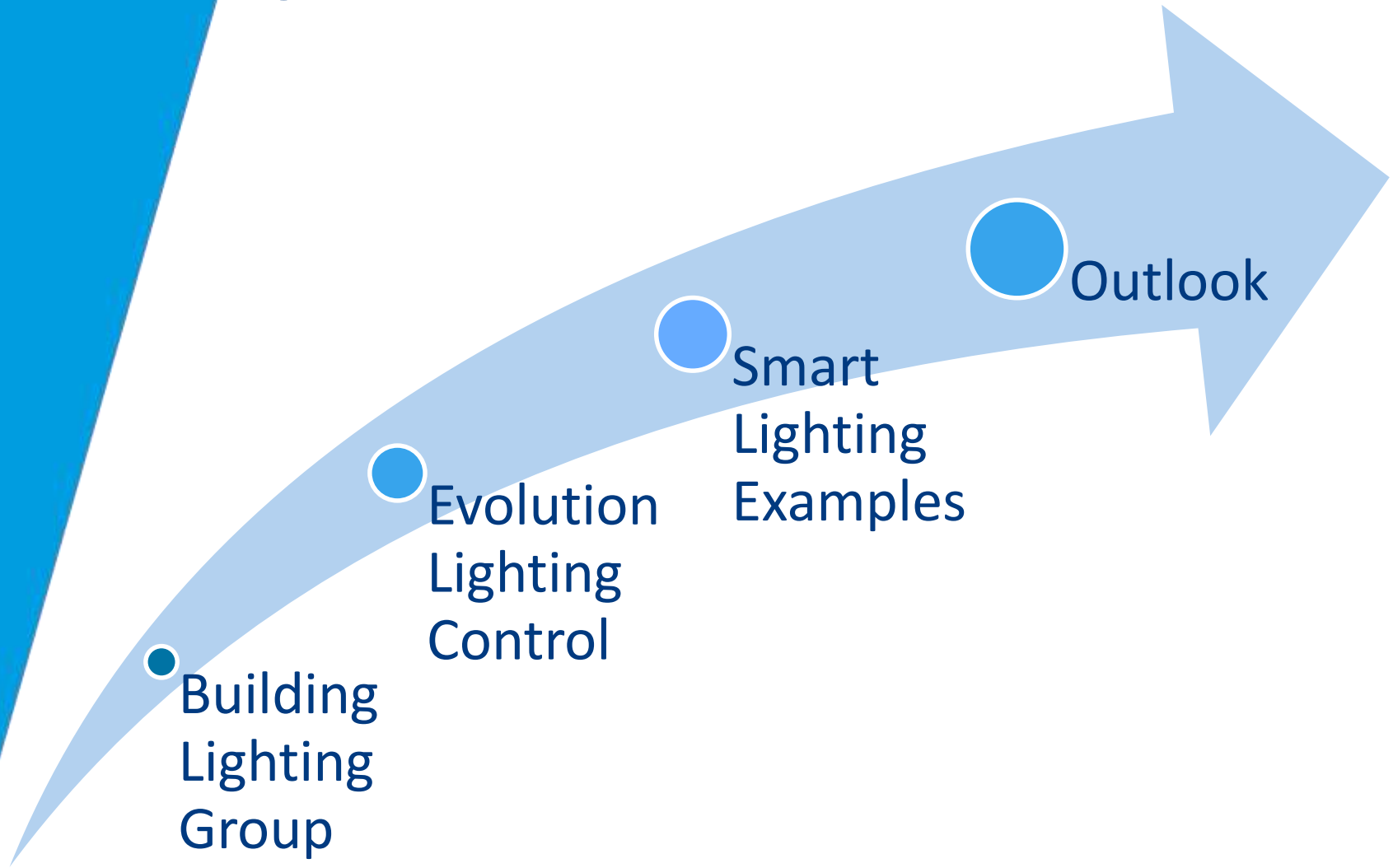


Welke opties zijn er om dynamisch licht goed toe te passen

Prof. Dr.-Ing. habil. Alexander Rosemann



Overview

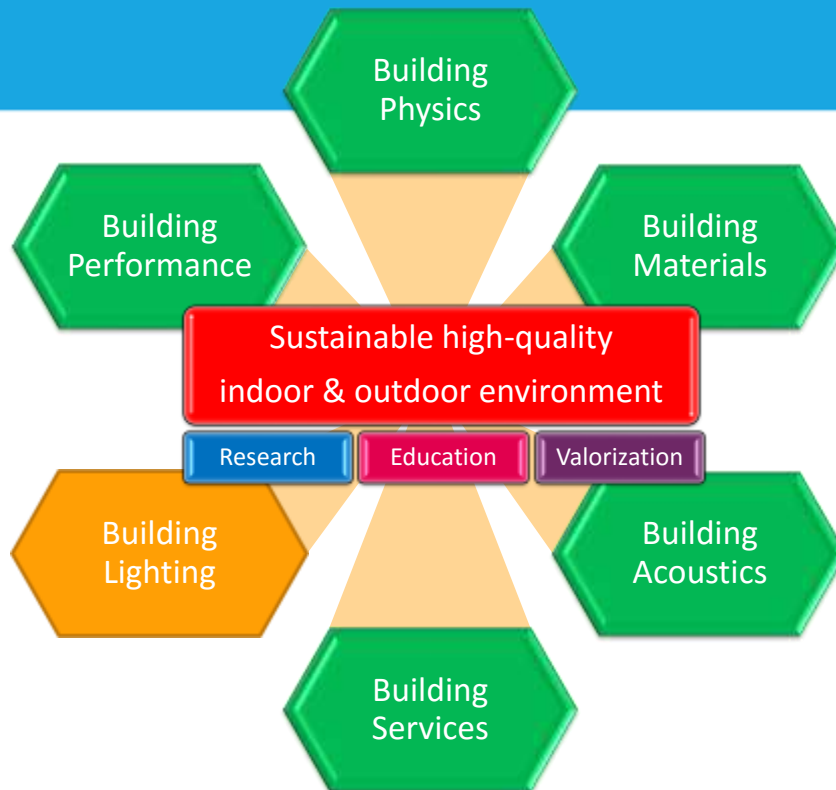


Who are we?

Eindhoven University of Technology
Department of the Built Environment
Unit Building Physics and Services

Intelligent Lighting
Institute

Center for Humans & Technology



Societal Challenges



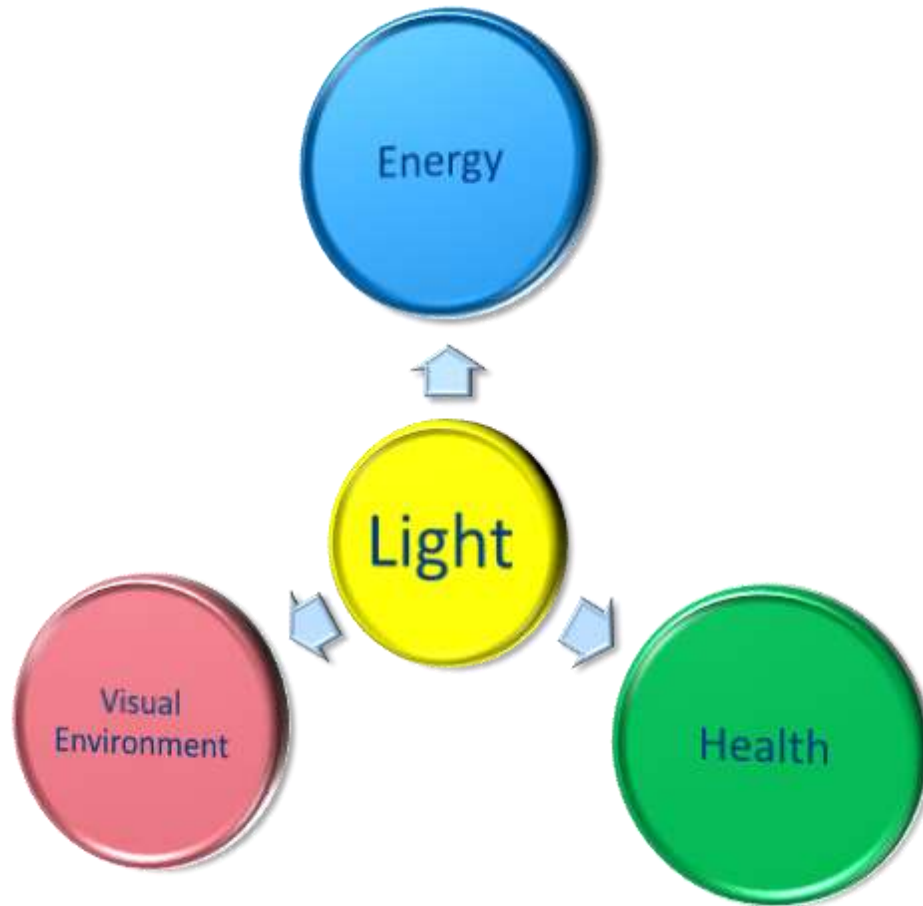
SAVE POWER.
SAVE MONEY.



Research Areas

Aligned with:

- Societal Challenges
- TU/e Strategy



Combining the three areas

Reach a balance



Human Centric Lighting

Good lighting design must therefore consider all aspects relevant to

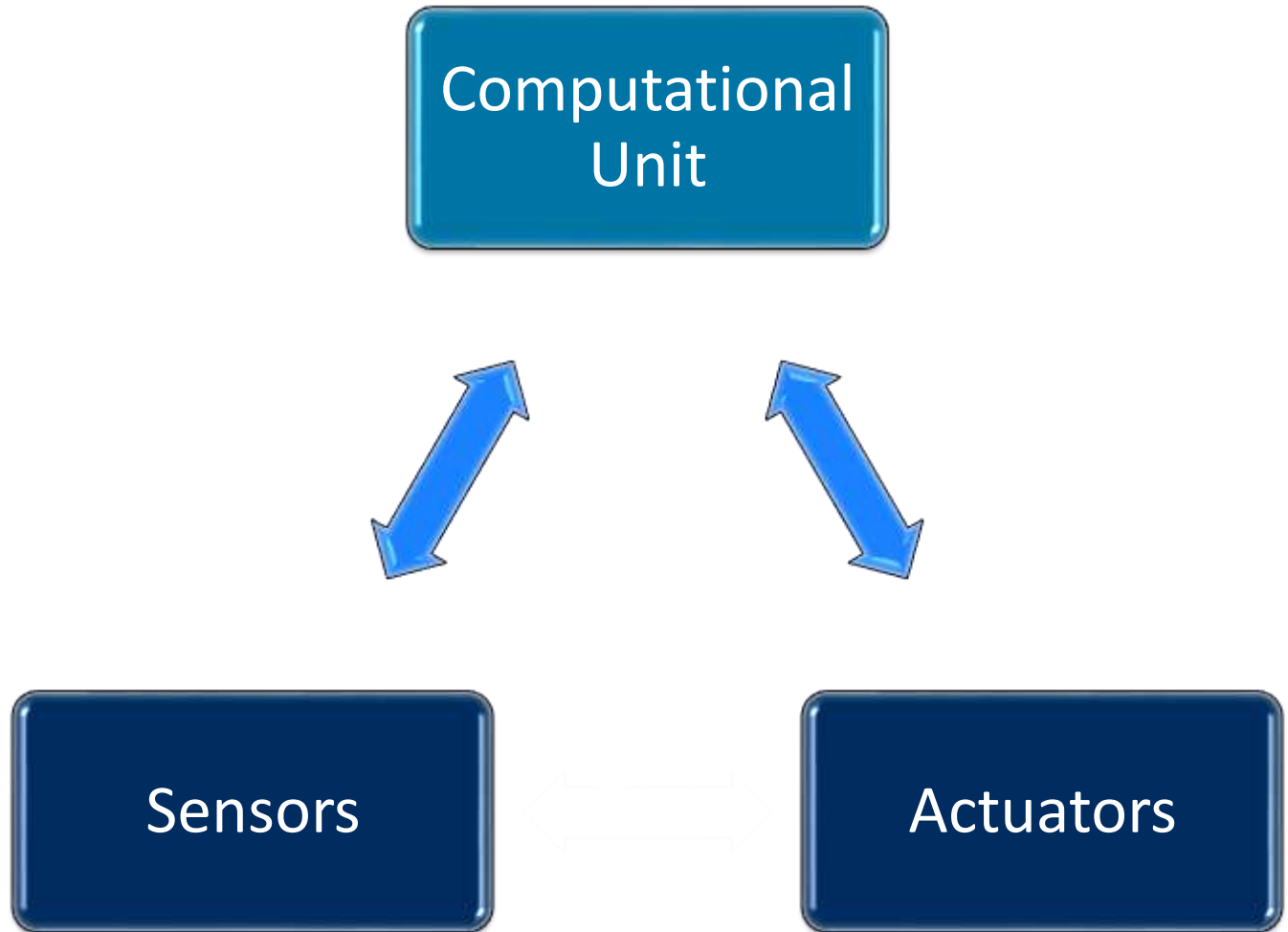
- *the energy efficiency of a lighting system,*
- *creating a good visual environment, and*
- *creating a healthy luminous environment.*

Evolution Lighting Control



<http://isha.sadhguru.org/>

Controls



Control Triggers

Lighting controls make *modifications* to the operation of a lighting system triggered by *external input*.

- Manual controls
- Time-triggered controls
- Occupancy controls
- Light sensors

• “Others”?

Interaction with the Lighting System

Switching



Interaction with the Lighting System

Dimming



Interaction with the Lighting System

Changing Distribution



Interaction with the Lighting System

Changing Spectral Distribution



Many degrees of freedom

- On / off
- Dimming
- Change of distribution
- Change of illuminant
 - Correlated Colour Temperature
 - Colour Rendering Properties
 - Effective irradiances



Smart Lighting

- Providing the right **infrastructure**
 - Lighting System
 - Sensors
 - Control System
- Serving the **needs** of the user
 - Algorithms to meet expectations
- Allow for **user interaction**
 - Correction
 - Communication of preferences

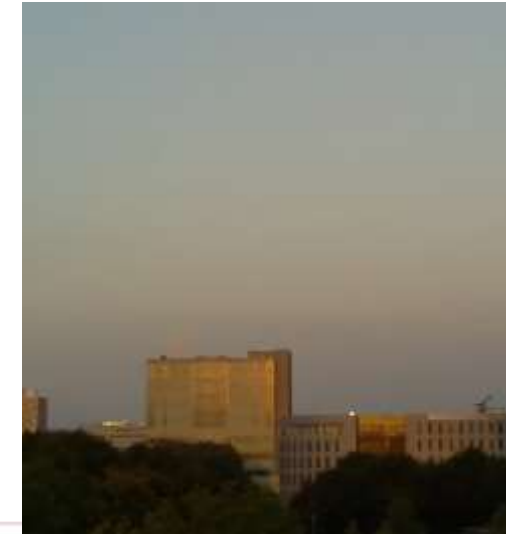
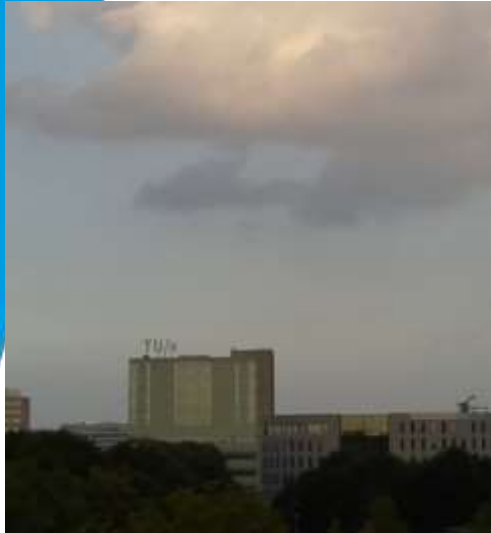


System



Service

Daylight dynamics



Describing Lighting Design Goals for Dynamic Lighting

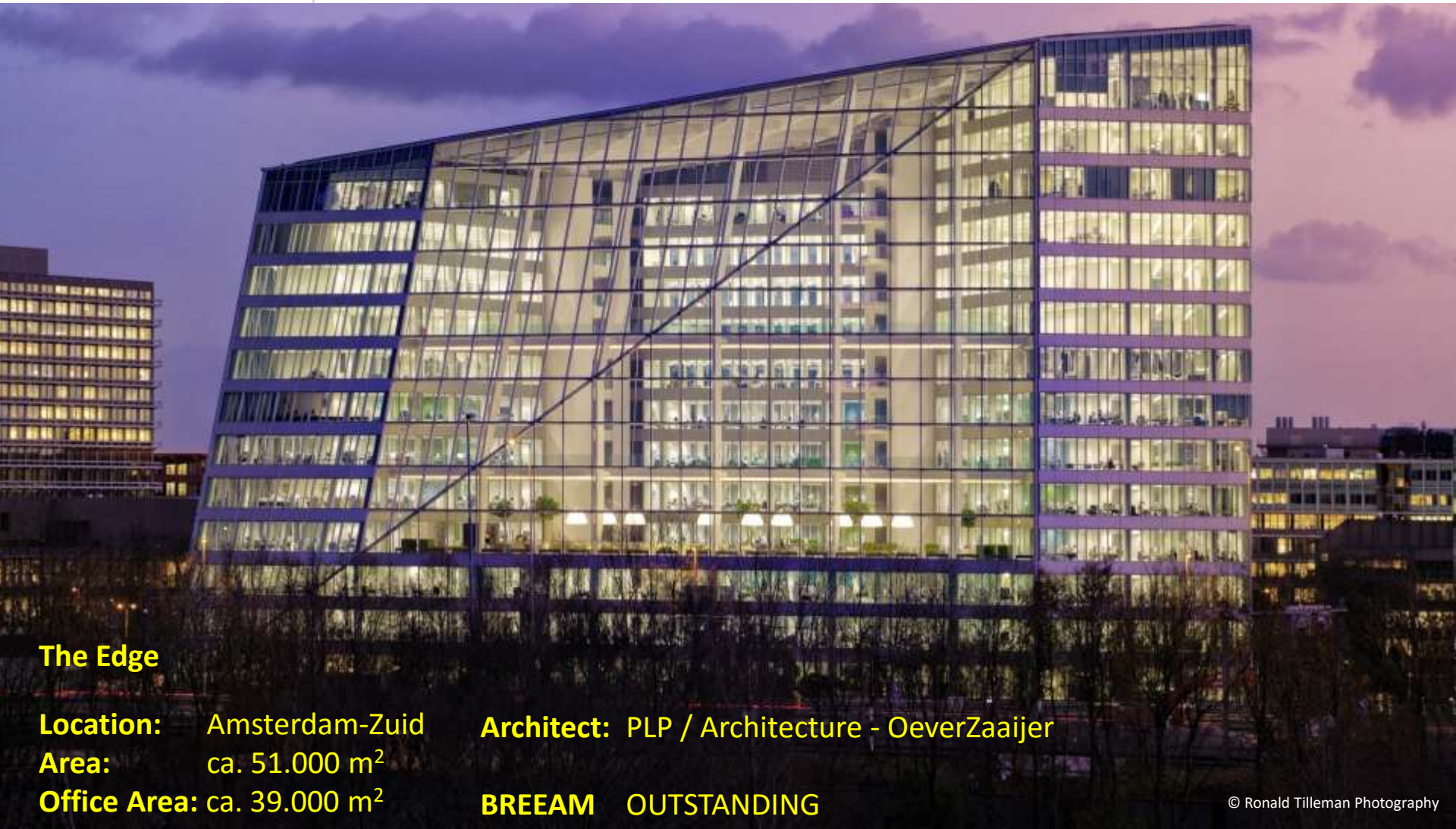
- Recommendations on minimum requirements
- **Dynamics** of illuminance / luminance distribution
- **Dynamics** of colour
- **Dynamics** of effective irradiances

Example: Office Lighting



CHEO

Creating Healthy Environments - Offices



The Edge

Location: Amsterdam-Zuid

Area: ca. 51.000 m²

Office Area: ca. 39.000 m²

Architect: PLP / Architecture - OeverZaaijer

BREEAM OUTSTANDING



1000 0111 - 0000 0000

epbe ent

to store
the act

office building
space and

More Control Triggers

update

Lighting controls make *modifications* to the operation of a lighting system triggered by *external input*.

- Manual controls
 - Time-triggered controls
 - Occupancy controls
 - Light sensors
- “Others”?
 - *Who is in the area?*
 - *What are they doing?*
 - *How do they feel?*

Short Example: Stadium Lighting

Dynamic Lighting
supports the quality
of life

It's an evening match, the lights look great.

Stadium Lighting



Stadium Lighting



Stadium Lighting



Functions of Stadium Lighting



- Entertaining

- Safe

- Functional

Outlook



Digitization of Light



Internet of Things



Big Data

Lighting provides the infrastructure in the built environment for connected sensor networks

Outlook



Digitization of Light



Internet of Things

In lighting there will be more



Big Data

- **Dynamics**
- **Sensors**
- **Data**

Outlook



Digitization of Light



Internet of Things



Big Data

These technologies enable human centric lighting in smart cities.

→ **Provide great lighting to the users**

What is the “next big thing”?



- Collaborate in public private partnerships
- Share your needs and wishes
- Work with us to generate the knowledge you need

Welke opties zijn er om dynamisch licht goed toe te passen

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Dank u voor
uw aandacht

