

# Integrated Solutions for Daylight and Electric Lighting

## EBC ANNEX 77 - IEA SHC TASK 61

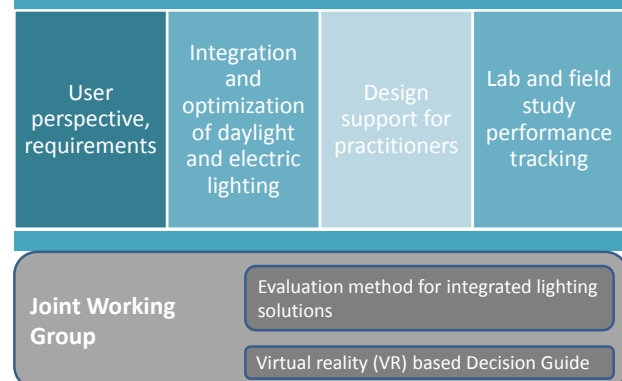
This project focussed on research and development to create and develop strategies combining daylighting and appropriate lighting control systems.

Useful knowledge and results from research has been gathered concerning the perceptions of building occupants on lighting quality, user interfaces and control strategies. The project proposed models for lighting controls that integrate occupant behaviour and expectations. It identified best practice approaches for control solutions for lighting and daylighting (movable components of windows), with wireless and wired controls, open loop and closed loop, Internet of Things, etc). It also conducted onsite and laboratory monitoring of innovative solutions and published the findings to document their benefits. Part of the work has led to deliverables to inform standardization proposals, particularly in relation to CEN and ISO.

### PROJECT OBJECTIVES

- 1 Reviewing the relationships between occupant perspectives and energy in the emerging era of 'smart and connected lighting' for a sample of buildings. Consolidate findings and create 'personas' reflecting the behaviours of typical occupants.
- 2 Based on a review of specifications concerning lighting quality, non-visual effects, ease of design, installation and use, provide recommendations for energy regulations and building performance certificates.
- 3 Assessing and improve the technical, environmental and financial robustness of integrated daylight and electric lighting approaches.
- 4 Demonstrating and verify concepts through laboratory studies and real use cases based on performance validation protocols.
- 5 Developing integral photometric, occupant comfort and energy rating models as pre-normative work linked to relevant bodies, including CIE, CEN, ISO, and initiate standardization activities.
- 6 Providing decision making and design guidelines incorporating virtual reality sessions. Integrate approaches into widespread lighting design software

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The project structure of EBC Annex 77 / SHC Task 61. The four subtasks generated the key results, which results have then been integrated by means of a joint working group. According to the individual focuses of stakeholders, the joint working group provided information tailored to

#### INTERNATIONAL ENERGY AGENCY

The International Energy Agency (IEA) was established as an autonomous body within the Organisation for Economic Co-operation and Development (OECD) in 1974, with the purpose of strengthening co-operation in the vital area of energy policy. As one element of this programme, member countries take part in various energy research, development and demonstration activities. The Energy in Buildings and Communities Programme has co-ordinated various research projects associated with energy prediction, monitoring and energy efficiency measures in both new and existing buildings. The results have provided much valuable information about the state of the art of building analysis and have led to further IEA co-ordinated research.

#### EBC VISION

By 2030, near-zero primary energy use and carbon dioxide emissions solutions have been adopted in new buildings and communities, and a wide range of reliable technical solutions have been made available for the existing building stock.

#### EBC MISSION

To accelerate the transformation of the built environment towards more energy efficient and sustainable buildings and communities, by the development and dissemination of knowledge and technologies through international collaborative research and innovation.

#### ACHIEVEMENTS

The following deliverables has been achieved:

- 'Personas for occupant-centered integrated lighting solutions' report
- 'Integration and optimization of daylight and electric lighting' report / source book
- 'Guidelines for the use of simulation in the design process of integrated lighting solutions' report
- 'Integrated solutions for daylighting and electric lighting in practice: results from case studies' report
- Initiation of new work items by appropriate standardization bodies and proposals for methods for draft standards
- Virtual reality decision guide
- A web-based tool providing an hourly lighting energy demand rating method
- Industry workshops

Standardisation issues related to lighting and daylighting control systems report was published as one of many official project deliverable.

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#### Project duration

Completed (2018 - 2021)

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#### Operating Agent

Dr Jan de Boer  
Group Leader Lighting Technology and Passive Solar Systems  
Department Energy Efficiency and Indoor Climate  
Fraunhofer Institute for Building Physics  
Nobelstr. 12  
70569 Stuttgart  
GERMANY  
+49 711 970 3401  
jan.deboer@ibp.fraunhofer.de

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#### Participating countries

Australia, Austria, Belgium, P.R. China, Denmark, Germany, Italy, Japan, the Netherlands, Norway, Slovakia, Sweden, Singapore, Switzerland, USA  
Observers: Brazil

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#### Further information

[www.iea-ebc.org](http://www.iea-ebc.org)

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