IEA SHC Task 61 / EBC Annex 77

Integrated Solutions for Daylight and Electric Lighting

From component to user centered system efficiency

Operating Agent: J. de Boer, DE

Subtask A	Subtask B	Subtask C	Subtask D
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User perspective, requirements	Integration and optimization of daylight and electric lighting	Design support for practitioners (Tools, Standards, Guidelines)	Lab and field study performance tracking

Joint Working Group

- Evaluation method for integrated lighting solutions
- Virtual Reality (VR) based Decision Guide

COORDINATION

Subtask A: User perspective and requirements
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Subtask B: Integration and optimization of daylight and electric lighting
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Subtask D: Lab and field study performance tracking
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Task duration: January 2018 – June 2021

FURTHER INFORMATION CONTACT DETAILS

Website: http://task61.iea-shc.org/
E-mail: task61.info@iea-shc.org

The deliverables will be available on the website.

In addition, workshops and newsletters will keep interested parties informed about Task progress and disseminate important outcomes.

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EBC Energy in Buildings and Communities Programme

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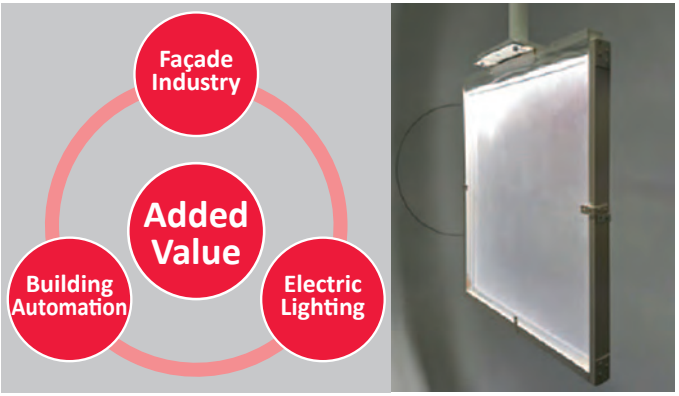
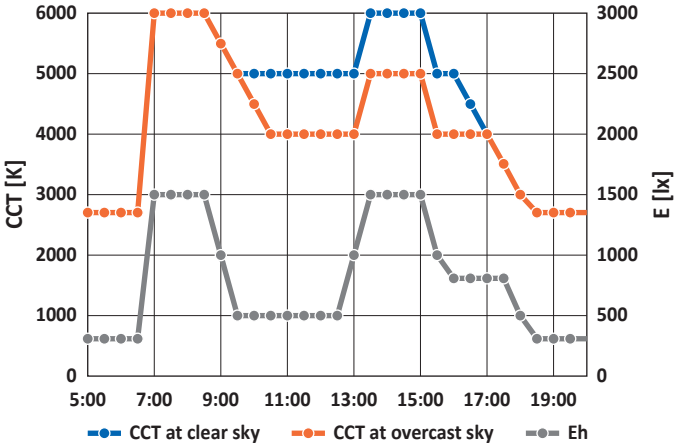
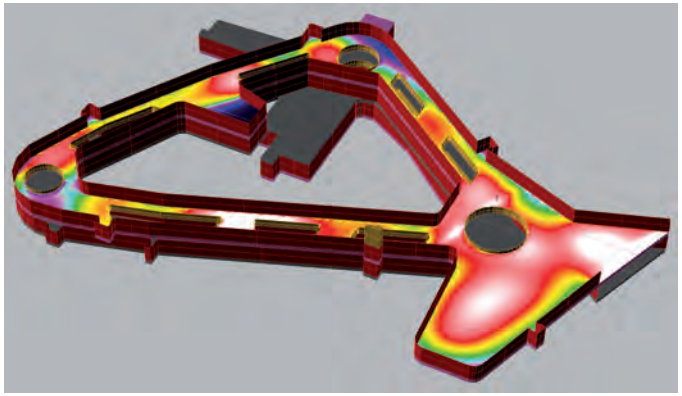


The task will work on integrating different building sectors involved (left). Example of a new integrated façade component, transmitting daylight while at the same time emitting electric light (right).



Advanced integrated lighting schemes allow better matches to new findings on user requirements.



Example of integrated daylighting and electric lighting design.

Large Potential for Saving Electricity

Lighting accounts for approximately 19 %, i.e. 2 900 TWh, of the global electric energy consumption. Projections by the IEA show that if governments only rely on current policies, global electricity use for lighting will grow to around 4 250 TWh by 2030. Due to the world's growing population and the increasing demand for electrically driven services in emerging economies, the increase will occur despite constant improvements in energy efficiency of lighting systems.

During the last years the focus has shifted towards digitalized lighting. This offers the chance to overcome problems in the integration of daylight and electric lighting: (New) technologies equipped with sensors, "intelligent" software and wireless data communication introduce large possibilities to bring the separate market sectors of electric lighting and façade technology closer together.

Research and developments in the field of energy efficient lighting techniques encompassing daylighting, electric lighting and lighting controls, combined with activities employing and bringing these techniques to the market, can contribute significantly to reduce worldwide electricity consumption and CO_2 emissions.

Outcomes for different Target Groups

Task 61 will generate diverse outcomes for different stakeholders:

- **Designers:** New integrated tools, system overviews, design guidelines, system performance information.
- **Standardization bodies:** Integrated daylighting and electric lighting hourly energy rating method, spectral modelling including new material datasets.
- **Industry:** Better integration of electric lighting and daylighting (façade).
- **Building managers:** More effective guidance on the calibration, ongoing adjustment and maintenance of integrated lighting systems.
- **Policy makers:** Advice to stimulate deployment of successful, energy efficient lighting schemes with added benefits to the citizens.
- **Building users:** Improved indoor conditions, to support health, comfort and energy efficiency.

Activities to Get There

The overall objective is to foster the integration of daylight and electric lighting solutions to the benefits of higher user satisfaction and at the same time energy savings. This includes the following activities:

- Review relation between user perspective and energy in the age of "smart and connected lighting".
- Consolidate findings in use cases and "personas" reflecting the behaviour of typical users.
- Provide recommendations for energy regulations and building performance certificates, based on a review of specifications concerning lighting quality, non-visual effects, installation and use.
- Assess and increase robustness of integrated daylight and electric lighting approaches.
- Demonstrate and verify or reject concepts in lab studies and real use cases.
- Develop integral photometric, user comfort and energy rating models (spectral, hourly) as pre-normative work linked to relevant bodies.
- Provide decision and design guidelines incorporating virtual reality sessions.

Deliverables

The following main deliverables are anticipated:

- Reports: e.g. "Personas for user centered integrated lighting solutions", "Integration and optimization of daylight and electric lighting", "Guidelines for the use of simulations in the design process of integrated lighting solutions", "Integrated solutions for daylighting and electric lighting in practice: results from case studies".
- Standardization: Initialization of new work items in standardization bodies. Proposal of methods for draft standards (BSDF system characterization, hourly lighting energy demand rating method).
- Virtual Reality Decision Guide as a joint effort of the task.
- Web-based tool of hourly lighting energy demand rating method as a joint effort of the task.

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