

IEA SHC Task 50:

Advanced lighting solutions for retrofitting buildings



Daylighting

Electric Lighting

Lighting Controls

January 2013 – December 2015

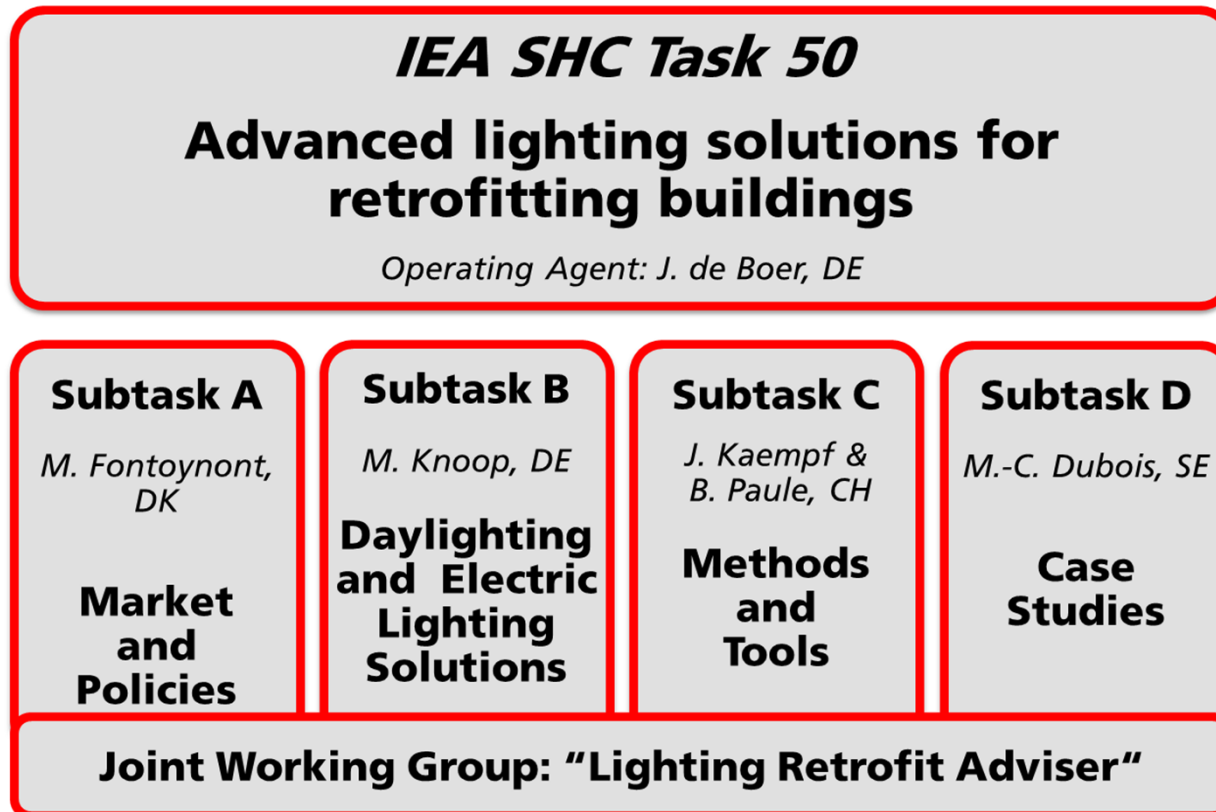


IEA SHC Task 50 *Advanced lighting solutions for retrofitting buildings*



Task Structure

The objective is to accelerate retrofitting of daylighting and electric lighting solutions in the non-domestic sector using cost - effective, best practice – approaches, which can be used on a wide range of typical existing buildings.



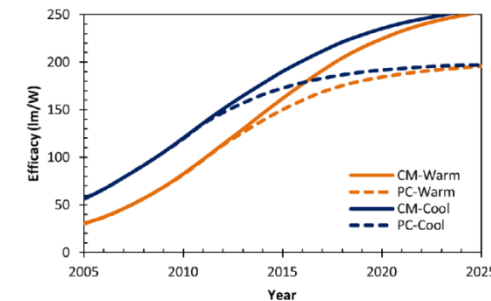
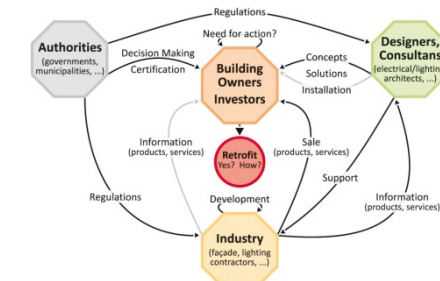
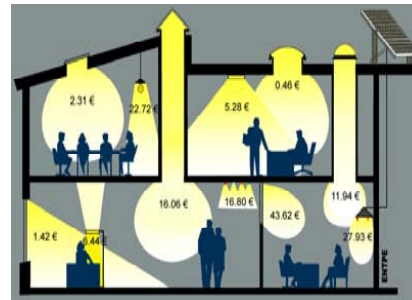
Subtask A: Market and Policies

[Coordination: M. Fontoynt, SBI, Denmark]



Objective: To understand and model the financial and energy impact associated to retrofitting daylighting and electric lighting of buildings.

- A.1 Global economical models
- A.2 Barriers and benefits
- A.3 Building Energy regulation and certification
- A.4 Proposal of action concerning value chain



	Typology / best solutions	TCO of lighting	Value benefit	Energy benefit	Function benefit	Human benefit	Other benefit
1.	Offices New blind system and blind control Ambient task lighting Task lighting conrio Daylight harvesting	€/m ²	2000 €/m ² (value) [ref] €/m ²	2 €/m ² .yr (lighting) 4€/m ² .yr (cooling & lighting)	Higher productivity €/m ²	less stress extra hours of comfortable work €/m ²	€/m ²

Subtask B: Daylighting and Electric Lighting Solutions

[Coordination: M. Knoop, TU Berlin, Germany]



Objective: To assess quality of existing and new solutions in the field of façade and daylighting technology, artificial lighting and lighting controls. To identify and structure existing and develop new lighting system technologies.

- B.1 Definition - system characterization
- B.2 Definition of (regional) baseline conditions
- B.3 Review of state of the art technology and architectural solutions
- B.4 New technical developments
- B.5 Measurements of selected state of the art and new technologies
- B.6 Source book

The screenshot shows a website page titled "LED Retrofit for T8 / T5 lamps". The page is part of a project called "PROJEKT TAGESLICHTNUTZUNG IN GEBÄUDEN IV" by "Lichttechnik". The sidebar on the left has three sections: "Building intervention level", "Building Sk...", and "Building Equipment". The main content area includes:

- LED Retrofit for T8 / T5 lamps**: A photograph of two fluorescent tubes and a text box explaining that LED retrofit lamps are used to replace fluorescent lighting to reduce energy consumption and increase lifetime.
- Performance of LED Retrofit for T8 / T5 lamps**: A text box stating that LED retrofit lamps are slightly more energy efficient (up to 105 lm/W) than T8 fluorescent lamps. It also mentions that the beam angle is smaller, which can affect lighting quality.
- Energy efficiency, Maintenance & Costs, Lighting Quality, Ease of use & retrofit aspects**: A section with four horizontal bars and a legend. The legend includes: Quick replacement possible, long lifetime (green); Medium reduction of energy consumption (20 - 40%) (yellow); Possibly weak on lumen output and colour rendering (orange); The majority of lamps has a smaller beam angle resulting in lower vertical illuminances (red).
- Still missing:** Power factor information, lumen depreciation, flicker details, dimm characteristics, glare due to small light sources.
- Link zur Fallstudie...**
- To be used when a simple retrofit is required and low maintenance and life time are important. Lighting quality is not enhanced.**
- Bibliography:** Myer, M.A., Paget, M.L., Lingard, R.D. (2009) CALPER Benchmark Report - Performance of T12 and T8 Fluorescent Lamps and Troffers and LED Linear Replacement Lamps; Ryckaert, W.R. et al. (2011): Performance of LED linear replacement lamps; Ryckaert, W.R.; Smet, K.A.G.; Roelands, I.A.A.; van Gils, M.; Hanselaer, P. (2012): Linear LED tubes versus fluorescent lamps: An evaluation.

At the bottom of the page, there is a "BACK" button and the footer text: "Fachgebiet Lichttechnik der Technischen Universität Berlin Impressum".

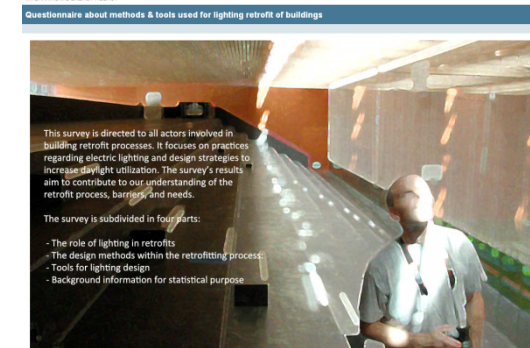
Subtask C: Methods and Tools

[Coordination: Jérôme Kaempf, EPFL, Bernard Paule, Estia, Switzerland]

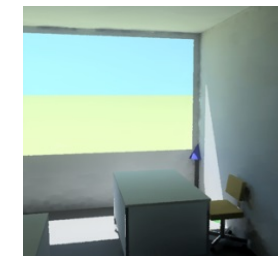
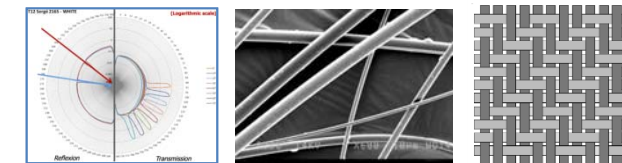
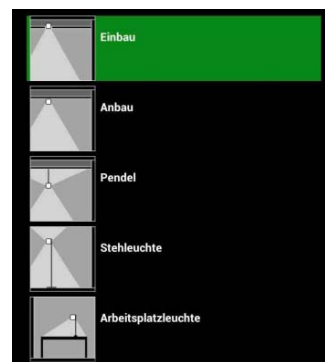
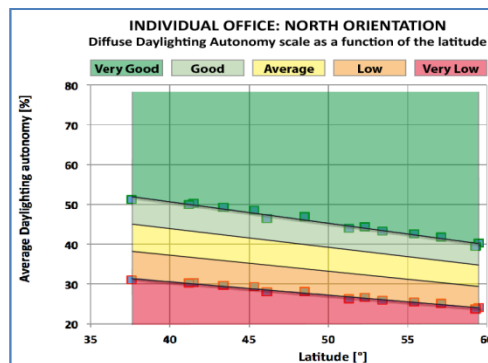


Objective: Provide methods and tools to make energy efficiency and economics of lighting retrofits transparent to stakeholders.

- C.1 Analysis of workflow and needs
- C.2 State of the art review
- C.3 Development of a simple integrated rating model
- C.4 Energy audit and inspection procedures
- C.5 Advanced and future simulation tools



* Options
 Start
 More info on IEA-SHC Task 50



IEA SHC Task 50 *Advanced lighting solutions for retrofitting buildings*

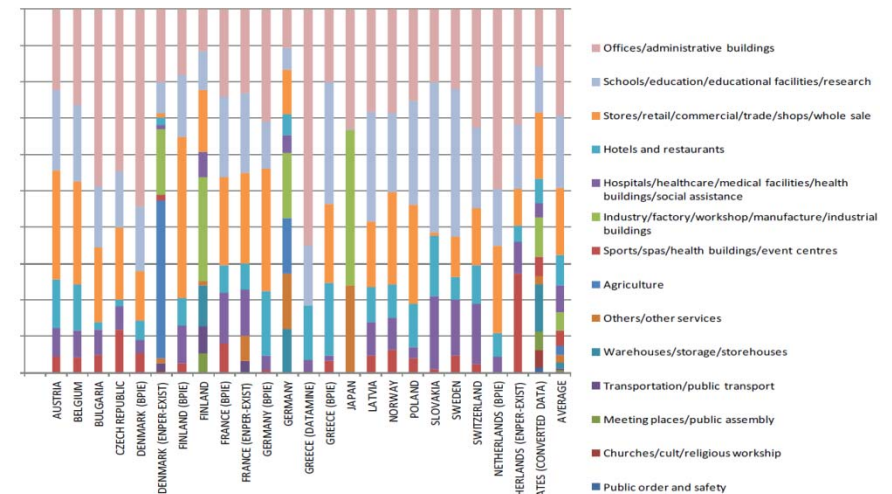
Subtask D: Case Studies

[Coordination: Marie-Claude Dubois, Niko Gentile, Lund University, Sweden]



Objective: Perform building stock analysis including generation of a building typology for lighting retrofits. Based on this deliver proven and robust evidence on achievable savings and show integrated retrofit strategies for representative Case studies

- D.1 Building stock/typology
- D.2 State-of-the-art review
- D.3 Assessment and monitoring procedure
- D.4 Case study assessment
- D.5 Overall conclusions, lessons learned
- D.6 Case study book / e-documentation



IEA SHC Task 50 *Advanced lighting solutions for retrofitting buildings*

Lighting Retrofit Adviser

design inspirations, design advice, decision and design tools for relighting



You are

START

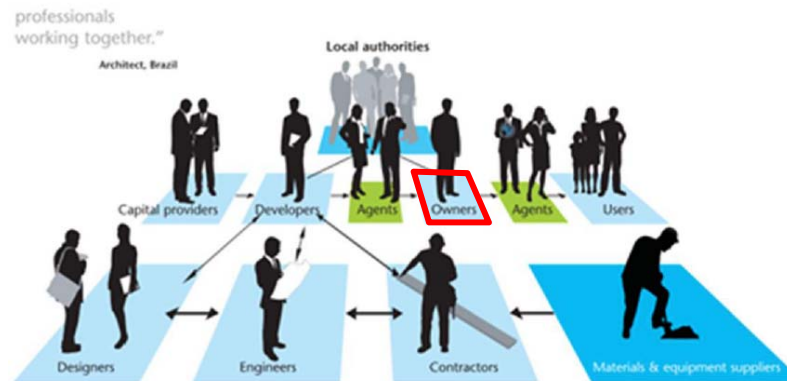
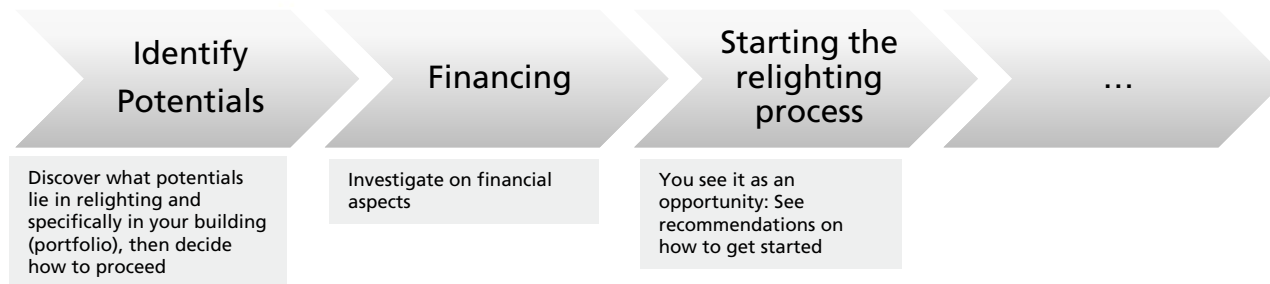
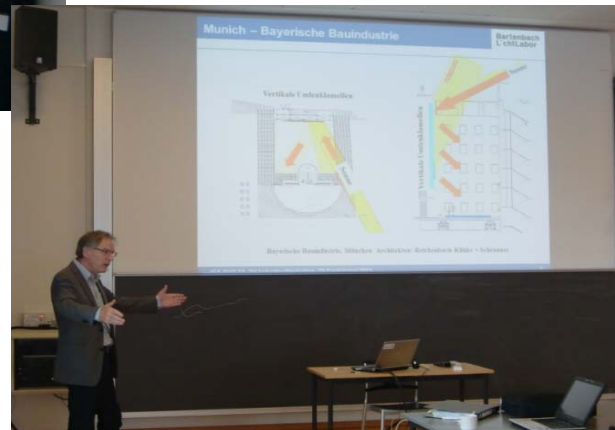
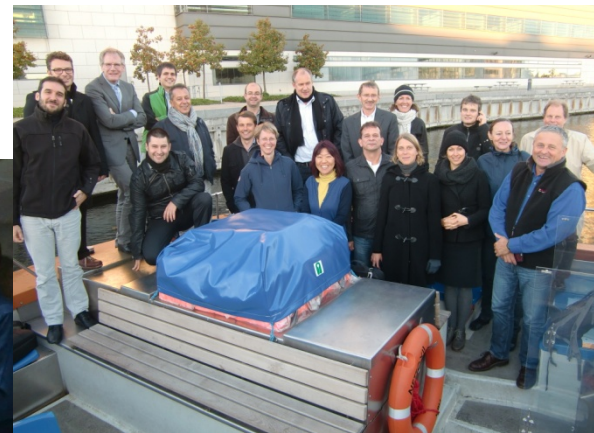


Figure 8: The complex value chain



- Identify demands by simple question, who the user is
- Configure the contained information (components) into a suited workflows
- Leave access to other information (components) open
- Here a more target group oriented starting page.

Who is behind the activity ...



30 participants

18 universities/institutes/companies

14 Countries

Information & Dissemination

IEA SHC HOME TASK HOME MEMBER LOGIN SEARCH

SHC
SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

SHC Task 50
Advanced Lighting for Retrofitting Buildings

Home > Publications

Project (Task) Publications

The following are publications developed under Task 50:

Task 50 Brochure
Advanced Lighting Solutions for Retrofitting Buildings
Juli 2013 - PDF 1,45MB - Posted: 7.16.2013

The overall objective is to accelerate retrofitting of daylighting and electric lighting solutions non-residential sector using cost effective best practice approaches, which can be used on typical existing buildings.

Search:

Order by: Publication Date Descend

Example of a simple tool easy and quick

Deliverables

Within the scope of Task 50, the deliverables are anticipated:

- Report on the lighting retrofit policy issues and proposals
- Source book on daylighting retrofit technologies, covering advanced retrofit solutions
- Toolbox with (simple) methods and economic auditing, risk simulation
- Documentation of realized lighting retrofits for different building types
- "Lighting Retrofit Adviser"
An electronic, interactive design advice and recommendation making tools and design tool

Most deliverables will be available in 2013. In addition, Workshops and Training courses will be organized to progress and disseminate important information.

<http://task50.iea-shc.org/>



Newsletter 1 Overview and first results

March 2015

IEA SHC Task 50: Advanced Lighting Solutions for Retrofitting Buildings

DAYLIGHTING – ELECTRIC LIGHTING – LIGHTING CONTROLS

BACKGROUND AND OBJECTIVES

Lighting accounts for approx. 19 % (~3000 TWh) of the global electricity consumption. Without essential changes in policies, markets and practical implementations it is expected to continuously grow despite significant and rapid technical improvements, like solid-state lighting, new façade and light management techniques. With a small volume of new

buildings, major lighting energy savings can only be realized by retrofitting the existing building stock. Compared to existing installations, the majority of new solutions allow a significant increase in efficiency – easily by a factor of three or more – going along with highly interesting payback times. However, lighting refurbishments are still lagging behind compared to what is economically and technically possible and feasible.

With the activities in Task 50, we aim at improving the lighting refurbishment process in non-residential buildings in order to unleash energy saving potentials while at the same time improving lighting quality. The overall objective is to accelerate retrofitting of day-lighting and electric lighting solutions in the non-domestic sector using cost effective, best-practice approaches, which can be used on a wide range of typical existing buildings.

This includes the following activities:

- Develop a sound overview of the lighting retrofit market
- Trigger discussion, initiate revision and enhancement of local and national regulations, certifications and loan programs
- Increase robustness of daylight and electric lighting retrofit approaches technically, ecologically and economically
- Increase understanding of lighting retrofit processes by providing adequate tools for different stakeholders
- Demonstrate state-of-the-art lighting retrofits
- Develop as a joint activity an electronic interactive source book including design inspirations, design advice, decision tools and design tools

This newsletter presents first results of IEA Task 50 addressing current topics in lighting retrofits.

Content

By-passing Barriers for lighting retrofits: Is Solid State Lighting already changing the game?	Page 2
Towards a database of lighting retrofit technologies: Catalogue of criteria	Page 4
Lighting retrofit in current practice: Evaluation of a survey with more than 1000 participants	Page 6
Assessment of lighting retrofits in practice: First application of a new monitoring protocol	Page 7
Outlook – Interactive presentation of results in an electronic source book: The Lighting Retrofit Adviser	Page 9
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„Low hanging fruits“



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