IEA SHC Task 50:
Advanced lighting solutions for retrofitting buildings

Daylighting
Electric Lighting
Lighting Controls

January 2013 – December 2015
Lighting and Energy: **Potentials in Retrofitting**

Only small volume of new building constructions

40-50% of turnover of facade and lighting industry in retrofitting

75% of appliances outdated (older than 25 a)

~3% retrofit rate
(estimation facade and lighting industry)

“Lighting retrofits can save significant amounts of energy costeffectively”

LIGHT'SLABOUR'S LOST, Policies for Energy-efficient Lighting, IEA, 2006

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.

IEA SHC Task 50
Advanced lighting solutions for retrofitting buildings

Operating Agent: J. de Boer, DE

Subtask A
M. Fontoynont, DK
Market and Policies

Subtask B
M. Knoop, DE
Daylighting and Electric Lighting Solutions

Subtask C
J. Kaempf & B. Paule, CH
Methods and Tools

Subtask D
M.-C. Dubois, SE
Case Studies

Joint Working Group: “Lighting Retrofit Adviser”
Subtask A: **Market and Policies**  
*Coordination: M. Fontoynont, 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

<table>
<thead>
<tr>
<th>Typology / best solutions</th>
<th>TCO of lighting</th>
<th>Value benefit</th>
<th>Energy benefit</th>
<th>Function benefit</th>
<th>Human benefit</th>
<th>Other benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offices</td>
<td>€/m²</td>
<td>€/m² (value)</td>
<td>€/m² (lighting)</td>
<td>Higher productivity</td>
<td>€/m²</td>
<td>€/m²</td>
</tr>
<tr>
<td>New blind system and blind control Amb. task lighting Task lighting control Daylight harvesting</td>
<td>2000</td>
<td>2 €/m² (lighting) 4€/m² yr (cooling)</td>
<td>2 €/m² (lighting)</td>
<td>2 €/m² (lighting)</td>
<td>less stress extra hours of comfortable work</td>
<td>€/m²</td>
</tr>
</tbody>
</table>
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
Subtask B: **Daylighting and Electric Lighting Solutions**

**B4: New Technologies: Facade Components & Demand Driven Lighting**

A. Kostro / Leso-PB/EPFL  
B. Aktuna / FHG-IBP  

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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
Subtask D: **Case Studies**  
*Cordination: Marie-Claude Dubois, 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 retrofittng buildings*
## Subtask D: Case Studies

### D4: Case Study Assessment

**NEW Case study buildings, by country**

<table>
<thead>
<tr>
<th>Country</th>
<th>Category</th>
<th>Name</th>
<th>Location</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Sweden</td>
<td>Education</td>
<td>E-huset</td>
<td>LTH Campus, Lund</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Education</td>
<td>V-huset</td>
<td>LTH Campus, Lund</td>
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<td></td>
<td>Education</td>
<td>A-huset</td>
<td>LTH Campus, Lund</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Office</td>
<td>(see Peter Pertola)</td>
<td>Stockholm</td>
<td>See PP</td>
</tr>
<tr>
<td></td>
<td>Office</td>
<td>(see Peter Pertola)</td>
<td>Stockholm</td>
<td>See PP</td>
</tr>
<tr>
<td></td>
<td>Education</td>
<td>School ?</td>
<td>Helsingborg</td>
<td>See NG</td>
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<tr>
<td>Denmark</td>
<td>Office</td>
<td>Horsens Town Hall</td>
<td>Horsens</td>
<td></td>
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<tr>
<td></td>
<td>Industry</td>
<td>Alfa Laval building</td>
<td>Ask WO</td>
<td></td>
</tr>
<tr>
<td></td>
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<td>School</td>
<td></td>
<td>See WO</td>
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<tr>
<td>Belgium</td>
<td>Office</td>
<td>BBRI</td>
<td>Limelette (Wavre)</td>
<td>Via AD</td>
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<td>Rietheim-Weilheim</td>
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<td>Stuttgart</td>
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<td>Health Care</td>
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<td>Education</td>
<td>Friedrich-Fröbel-School</td>
<td>Olbersdorf</td>
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<td></td>
<td>Office</td>
<td>Ask RJ</td>
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<td></td>
<td>Education</td>
<td>School Ask RJ</td>
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<tr>
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<td>Retail</td>
<td>Shop Ask RJ</td>
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<td></td>
<td>Industry</td>
<td>Workshop Ask RJ</td>
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<td>Other</td>
<td>Exhibition space Ask RJ</td>
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<tr>
<td>Norway</td>
<td>School buildings</td>
<td>???</td>
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<td>See BM</td>
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<td></td>
<td>Campus NTNU</td>
<td>For sure</td>
<td>See BM</td>
<td></td>
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<tr>
<td>China</td>
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IEA SHC Task 50 *Advanced lighting solutions for retrofitting buildings*
Joint Working Group: Lighting Retrofit Adviser

[Coordination: Jan de Boer, Fraunhofer-IBP, Germany]

Objective: To develop an electronic interactive source book (Lighting Retrofit Adviser) including and presenting all Task results in an user-friendly and target group specific way

JWG.1 Software Specification (Concept, Architecture and software design)

JWG.2 Concept evaluation and proof

JWG.3 Implementation

JWG.4 Quality assurance, validation and national adaptions
Lighting Retrofit Adviser

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

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.

Select your Country

You are Investor / Owner

START

Identify Potentials
Discover what potentials lie in relighting and specifically in your building (portfolio), then decide how to proceed

Financing
Investigate on financial aspects

Starting the relighting process
You see it as an opportunity: See recommendations on how to get started

START

Investor / Owner

IEA SHC Task 50 Advanced lighting solutions for retrofitting buildings
Who is behind the activity ...

30 participants
18 universities/institutes/companies
14 Countries

IEA SHC Task 50 Advanced lighting solutions for retrofitting buildings
Project (Task) Publications

The following are publications developed under Task 50:

**Task 50 Brochure**
Advanced Lighting Solutions for Retrofitting Buildings
Jul 2013 - PDF 1.45MB - Posted 7/16/2013
The overall objective is to accelerate retrofitting of daylighting and electric lighting solutions in non-residential sector using cost effective best practice approaches, which can be used on typical existing buildings.

http://task50.iea-shc.org/
„Low hanging fruits“