Final report

1.1 Project details

Project title	Energy-efficient lighting retrofit solutions, Partici-pation in new IEA SHC Task Task 50
Project identification (pro-gram abbrev. and file)	EUDP-12-I, Journalnr.: 64012-0150
Name of the programme which has funded the project	EUDP
Project managing compa-ny/institution (name and ad-dress)	Danish Building Research Institute, Aalborg University Copenhagen A C Meyers Vænge 15, 2450 København SV, Denmark

Project partners

Organization	Country
Bartenbach Lichtlabor	Austria
Univerty of Louvain	Belgium
Belgian Building Research Institute (BBRI)	Belgium
University of Brasilia	Brazil
China Academy of Building Research	China
Danish Building Research Institute	Denmark
Aarhus University	Denmark
Aalto University	Finland
Fraunhofer Institute of Building Physics	Germany
Fraunhofer Institute for Solar Energy Systems ISE	Germany
Technical University Berlin	Germany
Hochschule für Technik Stuttgart	Germany
Fraunhofer Institute of Building Physics	Germany
daylighting.de UG	Germany
University of Applied Science HFT, Stuttgart	Germany
Politecnico di Torino	Italy
Kyushu University, Fac. of Human-Environment Studies	Japan
Lighting Control Systems Group, Philips Research	The Netherlands
Norwegian University of Science and Technology, Trondheim	Norway
Institute of Construction and Architecture, Slovak Academy of Scienc-es	Slovakia
Lund University, Div. of Energy and Building, Sweden Design	Sweden
WSP Ingineers	Sweden
École Polytechnique Fédérale de Lausanne	Switzerland
ESTIA	Switzerland
Kaemco LLC	Switzerland

CVR (central business register)	29102384
Date for submission	30 November 2016

1.2 Short description of project objective and results

The overall objective was 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 included 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
- Develop as a joint activity an electronic interactive source book including design inspirations, design advice, decision tools and design tools

An overview of the Task results can be found in the Newsletter May 2016 of the IEA Solar Heating and Cooling Programme:
http://task50.iea-shc.org/data/sites/1/publications/IEA_SHC_Task_50%20Newsletter2.pdf

1.2b Beskrivelse af projektets formål og forventede resultater

Projektets hovedformål var at fremskynde renovering af belysningen i større bygninger ved at identificere og dokumentere omkostningseffektive, best-practice dagslys- og kunstlys-eksempler, som kan bruges på en bred vifte af typiske eksisterende bygninger. Projektet omfattede følgende aktiviteter:

- Tilvejebringe et bredt overblik over markedet for belysningsrenovering
- Igangsætte diskussion om og fremme revidering og forbedring af nationale lovbestemmelser, certificeringer og låneprogrammer
- Fremme helhedsorienterede dagslys- og kunstlys renoveringstiltag ud fra tekniske, miljømæssige og økonomiske aspekter
- Udvikle som en fælles aktivitet en elektronisk interaktiv grundbog med design inspirationer, design rådgivning samt et værktøj til brug i beslutningsprocesser og design

En oversigt over Task resultaterne kan findes i Nyhedsbrevet af maj 2016 fra IEA's Solar Heating & Cooling Programme:
http://task50.iea-shc.org/data/sites/1/publications/IEA_SHC_Task_50%20Newsletter2.pdf

1.3 Executive summary

The International Energy Agency offered an ideal platform for international collaborative R&D work. Several added values could be identified in a collaborative, international project compared to national activities. Participating countries took profit from the specific know-how of each of the other participants (such as study of the international state-of-the-art has to be done only once).

The figure shows the structure of the Task. The four different subtasks generated the key results. These results were then integrated in a joint working group in the "Lighting Retrofit Adviser".

According to the individual focus of interest the “Lighting Retrofit Adviser” provides design inspirations, design advice, decision and design tools tailored to the need of the different stakeholders.

By bringing together expertise from the IEA community the project managed to promote state-of-the-art and new lighting retrofit approaches that might cost more but offer a (further) reduction of energy consumption while improving lighting quality to a greater extend. Overall, the net profit for every participating country seems to be significantly higher compared to national activities with a similar level of effort.

The scope of the Task is on general lighting systems for indoor environments. The focus is laid on lighting appliances in non-domestic buildings. Technically the task deals with

- daylight utilization by better facade technologies and architectural solutions
- electric Lighting schemes addressing technology and design strategies
- lighting control systems and strategies

1.4 Project 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.

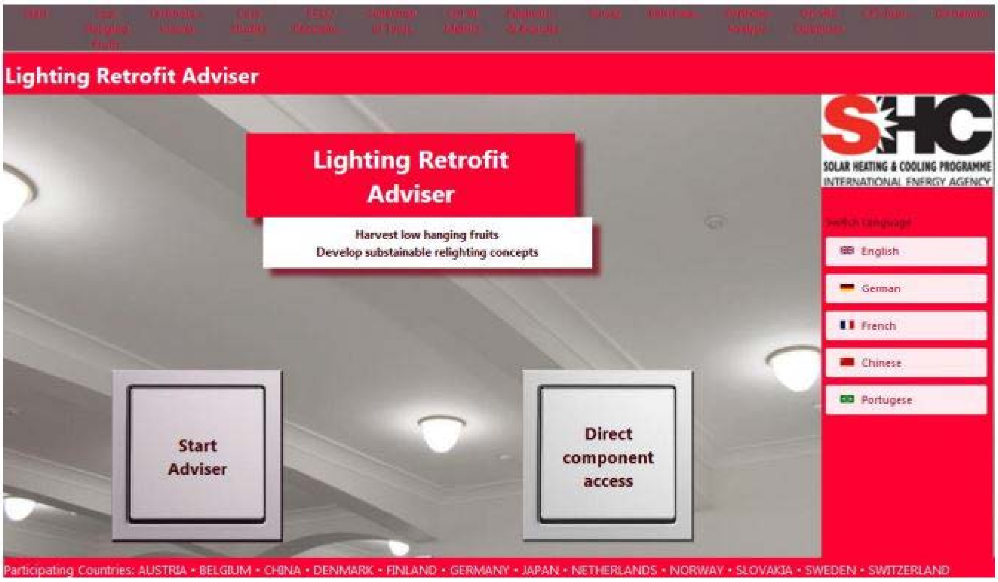
The overall objective is to accelerate retrofitting of day-lighting and electric lighting solutions in the non-domestic sector using cost effective, best-practice approaches, which can be used on a wide range of typical existing buildings.

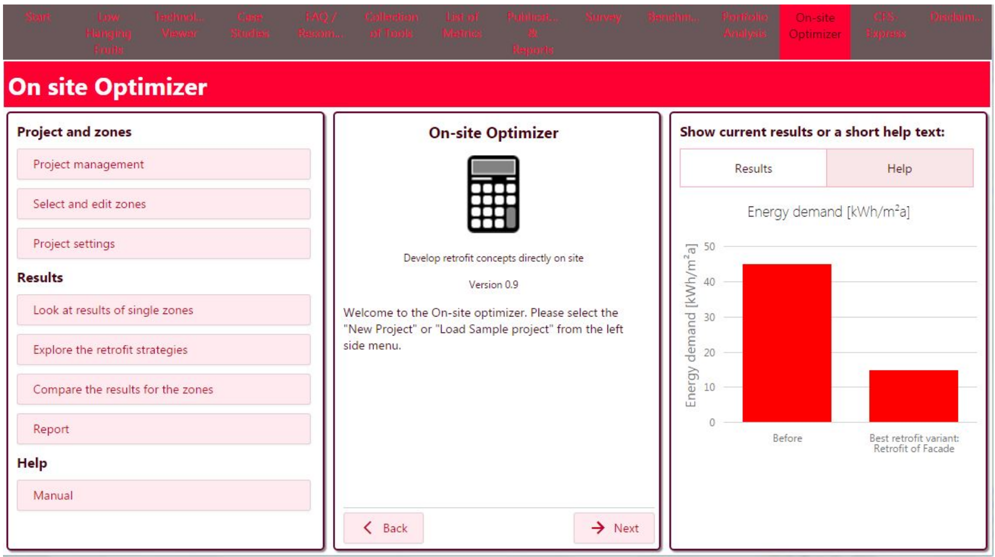
1.5 Project results and dissemination of results

With the activities in Task 50, we aimed 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 main result of the Task is the development of the "Lighting Retrofit Advisor", which is an integrative, comprehensive, multi-platform (desktop / mobile) tool for stakeholders involved in lighting retrofits and draws on the main results of the different subtasks:

- Authorities can find information on regulation and certification approaches for lighting retrofits.
- Investors can inform themselves on the economic boundary conditions of bringing new lighting systems into practice.
- Designers / consultants can make use of for instance an "On-Site Optimizer" that allows to develop retrofit concepts directly on site, while drawing from a knowledge database of 40+ retrofit techniques (daylight, electric lighting and lighting controls) and 20+ case studies.





The Lighting Retrofit Adviser is either available online or as an app for android or iOS.

Find the web version here:
http://www.lightingretrofitadviser.com/

An complete overview of the task results can be found in section 1.8 Annex.

1.6 Utilization of project results

Over its duration Task 50 has attracted high interest from industry. Altogether 6 industry workshops were organized in conjunction with the task meetings in Lund, Sweden, Copenhagen, Denmark, Innsbruck, Austria, Fukuoka, Japan, Ålesund, Norway and Brasilia, Brazil. With the industry workshops it was tried to continuously inform about general lighting retrofit issues and possible solutions and to mirror the Task activities with respect to industry and practitioners needs. The industry workshops were very well visited with altogether 390 participants. IEA SHC Task 50 was organized in four Subtasks and one Joint Working Group, in which with the Lighting Retrofit Adviser was developed.

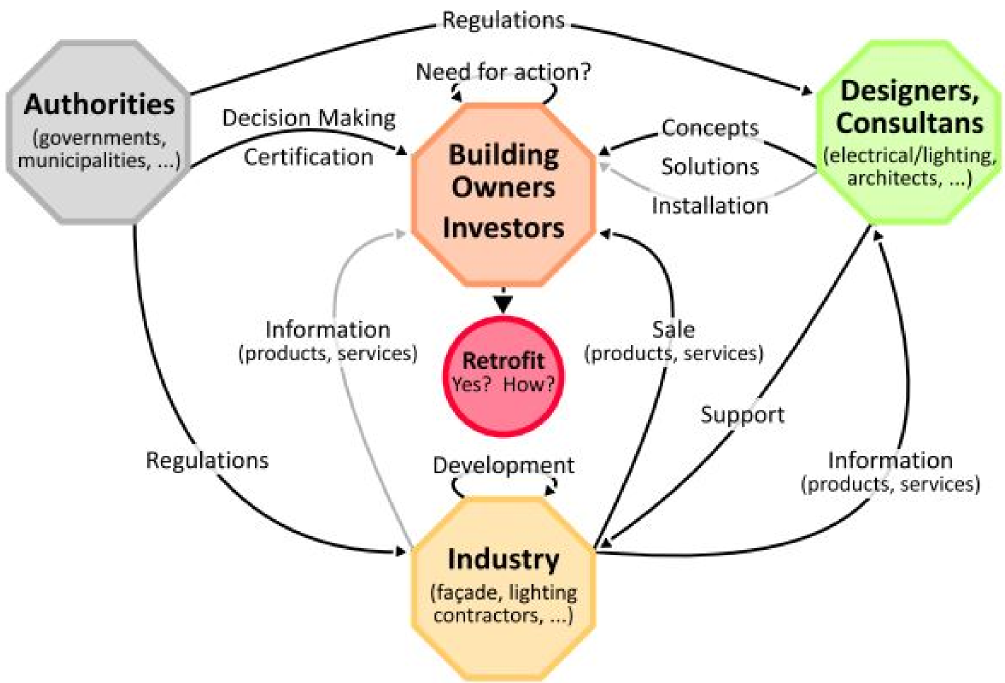
The Task results provide important new knowledge to the main stakeholders in the lighting retrofit market fulfilling different interests and needs, as illustrated in the figure:

Authorities like governments and municipalities
Interest: Meet energy efficiency and CO2 emission reduction goals
Needs: As lighting only gradually gets into focus – Improvement of regulations, standards, and certifications

Building owners/ investors
Interest: Optimization of total costs at different investment horizons / payback times
Needs: Transparent cost structures, added values like 'green image', health aspects, etc.

Industry
Interest: Economic success by adapting products and services to market developments
Needs: Changing focus on lighting-as-a –service and integral solutions

Designers/ consultants, e.g. lighting designers, architects, engineers
Interest: Providing optimal solutions for various cases
Needs: Support in lighting design as part of complex design process with diversity of approaches



Graphic scheme of stakeholders in the lighting market

1.7 Project conclusion and perspective

Energy efficient lighting is said to be one of the most cost-effective approaches to save energy and reduce $C0_2$ emissions. To stimulate the application of lighting retrofits of good quality, IEA Task 50 has looked into the assessment of existing and new technical retrofit solutions in the field of façade and daylighting technology, electric lighting and lighting controls. The project results provide information for those involved in the development of retrofit products or involved in the decision making process of a retrofit project, such as buildings owners, authorities, designers and consultants, as well as the lighting and façade industry. Simple retrofits, such as replacing a lamp or adding interior blinds are widely accepted and often applied because of their low initial costs or short payback periods. The IEA Task 50 result aim at promoting state-of-the-art and new lighting retrofit approaches that might cost more but offer a further reduction of energy consumption while improving lighting quality to a greater extend.

1.8 Annex: Task Reports and other publications

[T50 A.1 Global Economic Models]

Task 50 Subtask A Report A1

May 2016 - PDF 2.89MB - Posted: 2016-09-22

By: Marc Fontoynont, Jan de Boer, Johan Röklander, Karen Guldhammer, Nanna Sofie Gudmandsen, Yasuko Koga

This reports presents financial data related to lighting installations, before and after retrofit operations. Data are calculated over a large number of years to combine installation costs, maintenance, and energy use. The general principle was to compare the running costs of the “do nothing” approach (keeping the installation as it is and let it die gradually), and the costs associated with a retrofit with highly efficient equipment.

For these reasons, long term costs of installation are quite sensitive to the initial cost, and the combined cost of electricity and energy efficiency. Total Cost of Ownership (TCO) of lighting installations has been calculated for various types of buildings: offices, schools, homes and industrial buildings.

The data supplied attempt to answer to the following questions:

- Which installations are low hanging fruits (with shortest payback time)?

- For which type of building are retrofit operation more profitable?

- How do various parameters influence the payback time (investment costs, efficacy of luminaires and sources, cost of electricity, etc.)?

Then various financial models to initiate successful investments in retrofit operations with generally favourable potentials (like high number of operating hour with good reduction potentials of electric power density) were investigated:

- Direct investment by the user only, showing significant benefits after the payback time.

- Investment by the user based on loans. This extends payback time, but does not require too high of a financial contribution at the beginning.

- Leasing of the entire installation: the building owner does not own the installation. The lighting installation is rented (installation and operation is supplied by a third party). It appears that leasing is nowadays generally the best option is the best way to trigger lighting retrofit to overcome the barriers associated to investment.

[T50 A.2 Barriers and Benefits; Building energy regulation and certification]

Task 50 Subtask A Report A2

May 2016 - PDF 1.78MB - Posted: 2016-09-22

By: Marc Fontoynont, Jan de Boer, Johan Röklander, Karen Guldhammer, Nanna Sofie Gudmandsen, Yasuko Koga

This report addresses in a first part barriers and benefits in lighting retrofits and in second part building energy regulations and certifications.

Barriers and benefits
Benefit of lighting retrofits should be addressed in a broad manner: energy saving, increased value (and rental value), improved functionality, human and social benefits. A possible way, which was pursued in this study, was to compare benefits of lighting retrofits with benefits of other types of retrofits or actions (change of furniture, change of floor, etc.). Also various barriers which lead to postponement of lighting retrofits were identified, even when they are needed and cost effective.

Building Energy Regulation and Certification
Buildings are designed, constructed and operated in the context of standards, regulations or labels (e.g. sustainability labels). For typical and representative approaches on component and system basis critical analysis and comparisons were conducted. With respect to now highly efficient SSL lighting, measures like requesting a minimum luminaire efficiency, taking old installations (luminaires) out of operation and demanding a maximum energy demand on the basis of reference technologies are presented. In addition the sustainability labels LEED, BREEAM and DGNB were compared and recommendations for future developments

T50 A.3 Proposal of actions concerning the value chain

Task 50 Subtask A Report A3

May 2016 - PDF 0.89MB - Posted: 2016-09-22

By: Marc Fontoynont, Jan de Boer, Johan Röklander, Karen Guldhammer, Nanna Sofie Gudmandsen, Yasuko Koga


Proposal of Actions Concerning the Value Chain

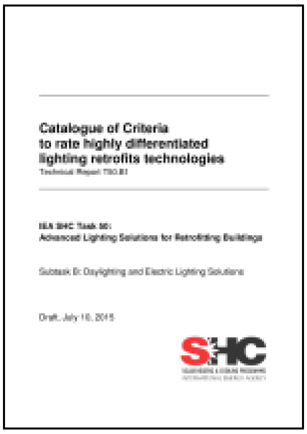
In this activity, possible actions which could be taken to stimulate the development of lighting retrofit campaigns were identifies, based on the figures from report A.1 “Global economic models” and A.2 “Barriers and Benefits; Building energy regulation and certification”. It was looked into how lighting retrofit benefits are assessed by stakeholders (manufacturers, installers, building managers, etc.). Key strategic actions, or key strategic data to deliver to each stakeholder to possibly trigger a decision concerning lighting retrofit were investigated. The objectives are to identify possible lack of awareness and know-how in the value chain, and to identify strategic information to deliver to stakeholders. Globally, the actions concern accelerating retrofits before the end of existing life of lighting installations: this means that benefits justify an anticipated (before end of gear lifetime) investment.

T50 B.1 Catalogue of Criteria

Task 50 Subtask B Report B1

September 2015 - PDF 1.57MB - Posted: 2016-09-22

By: Martine Knoop, Patrick Prella, Wilfried Pohl, Arnaud Deneyer Additional: Berat Aktuna, Stanislav Darula, David Geisler-Moroder, Kjeld Johnsen, Marta Malikova, Luo Tao, Eino Tetri


Catalogue of Criteria
to rate highly differentiated
lighting retrofits technologies

Using 30 quality measures, the Catalogue of Criteria can describe the performance of highly differentiated lighting retrofit solutions, qualitatively and to some degree quantitatively. It allows for comparison of state-of-the-art, new and future retrofit solutions on an equal and holistic basis. This approach promotes lighting retrofits that might cost more but also offer more benefits, which is reflected in the solutions’ quality defined by means of the Catalogue of Criteria. The set of criteria are used as basis for rating the 38 investigated technologies in the source book “Daylighting and electric lighting retrofit solutions”.

The Technology Viewer of the Lighting Retrofit Adviser is developed to convey the collected information within IEA Task 50, including approximately 50 different retrofit solutions. This tool within the Lighting Retrofit Advisor offers both a ‘quick glance’ on the retrofits’ performance for easy comparison, as well as detailed information on the selected solutions. When using the Catalogue of Criteria, future retrofit solutions can be compared with the currently available solutions as well.

T50 B.6 Daylighting and electric lighting retrofit solutions - A source book of IEA SHC Task 50

Task 50 Subtask B Report B6

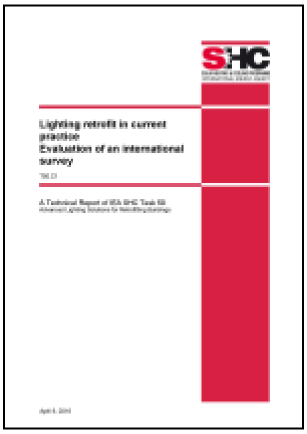
October 2016 - Posted: 2016-11-03
By: Martine Knoop, Berat Aktuna, Bruno Bueno, Stanislav Darula, Arnaud Deneyer, Aicha Diakite, Peter Fuhrmann, David Geisler-Moroder, Carolin Hubschneider, Kjeld Johnsen, Andre Kostro, Marta Malikova, Barbara Matusiak, Patrick Prella, Wilfried Pohl, Luo Tao, Eino Tetri
Editor: Martine Knoop
Publisher: Martine Knoop

Energy efficient lighting is said to be one of the most cost-effective approaches to save energy and reduce C02 emissions. In order to stimulate the application of lighting retrofits of good quality, IEA Task 50, Subtask B “Daylighting and Electric Lighting solutions” has looked into the assessment of existing and new technical retrofit solutions in the field of façade and daylighting technology, electric lighting and lighting controls. The document provides information for those involved in the development of retrofit products or involved in the decision making process of a retrofit project, such as buildings owners, authorities, designers and consultants, as well as the lighting and façade industry. This source book addresses both electric lighting solu¬tions and daylighting solutions, and offers a method to compare these retrofit solutions on a common basis, including a wide range of quality criteria of cost-related and lighting quality aspects. Simple retrofits, such as replacing a lamp or adding interior blinds, are widely accepted, often applied because of their low initial costs or short payback periods. The work presented in this report aims at promoting state-of-the-art and new lighting retrofit approaches that might cost more but offer a further reduction of energy consumption while improving lighting quality to a greater extend.
ISBN: 978-3-7983-2836-5

- Full Report
- PDF 7.85MB

T50 C.1 Lighting retrofit in current practice - Evaluation of an international survey

Task 50 Subtask C Report C1



May 2016 - PDF 1.48MB - Posted: 2016-09-22
By: Jérôme Kaempf, Bernard Paule Additional: Magali Bodart, Bruno Bueno, Stanislav Darula, Arnaud Deneyer, David Geisler-Moroder, Niko Gentile, Anna Hoier, Kjeld Johnsen, Yasuko Koga, Cláudia Naves David Amorim, Eino Tetri

Surveys and socio-professional studies carried out at national and international levels contribute to a better understanding of the lighting retrofit process. Within the framework of the International Energy Agency Task 50 - Advanced lighting solutions for retrofitting buildings- and its subtask C1 focusing on the analysis of workflows and needs, an online survey on lighting retrofit was initiated in December 2013. After 9 months, more than 1000 answers were collected. The survey provides clear insights about the workflow of building professionals and leads to a better understanding of their needs in terms of computer method and tools.

One of the main outcomes of the survey is that retrofitting strategies used in practice essentially focus on electric lighting actions such as of luminaires replacement and the use of controls. Generally, daylighting strategies are not rated as the highest priority. The results also indicate that practitioners mainly rely on their own experience and rarely involve external consultants in the lighting retrofit process. Furthermore, the survey results suggest that practitioners are interested in user-friendly tools allowing quick evaluations of their project, with a good compromise between cost and accuracy, and producing reports that can be directly presented to their client.

The survey also emphasized that the main barriers in using simulation tools are essentially their complexity and the amount of time it takes to perform a study. Practitioners are keen to use tools at preliminary design stage and would like to be able to estimate the cost and other key figures (energy consumption and lighting levels). The paper concludes with recommendations for the building software developers to address the needs of practitioners in a more suitable way.

T50 C.2 Methods and tools for lighting retrofits - State of the art review


SHC

Methods and tools for lighting retrofits
State of the art review

Task 50 Subtask C Report C2

May 2016 - PDF 17.93MB - Posted: 2016-09-22

By: Jérôme Kaempf, Bernard Paule Additional: Chantal Basurto, Magali Bodart, Jan de Boer, Bruno Bueno, Marie-Claude Dubois, David Geisler-Moroder, Marina Fusco, Markus Hegi, Michael Jorgensen, Nicolas Roy, Jan Wienold

This document proposes a state-of-the art review of the existing method and tools available on the market for practitioners. As starting point, the most used software were taken from the survey realised within C1, and those were categorised in four categories:

1) Facility management tools (global diagnostic tool including economic aspects)

2) Computer-assisted architectural drawing / Computer-aided design tools

3) Visualization tools

4) Simulation tools

The third category regarding the visualisation tools contains a warning for the practitioners, as they are not providing tangible results in terms of physical numbers. In total 20 software were described, and their main features compared in a table for a quick reference. Furthermore, the simulation tools were assessed using a case-study of a school refurbishment. Equivalent information given to practitioners was used to define the properties of the room (2D plans and photometric properties). Simulation experts were asked to simulate for daylight the daylight factor and for electric lighting the work plane illuminance. Results indicate a rather large dispersion for daylighting results between the different tools, even though the case-study was described with great care. However, on electric lighting the results remain within 10-15% range from the median value. The obtained results indicate that practitioners can rely on electric consumption computed by the tools during night time, but that the combination of daylight and electric light remains a challenge for simulation tools.

T50 C.5 Advanced and future simulation tools


SHC

Advanced and future simulation tools

Task 50 Subtask C Report C5

May 2016 - PDF 8.04MB - Posted: 2016-09-22

By: Jérôme Kaempf, Bernard Paule Additional: Jan de Boer, Eike Budde, Bruno Bueno, David Geisler-Moroder

The document reflects a study about the so called “advanced and future simulation tools”. The denominated software is able to simulate Complex Fenestration Systems (CFS) which are composed of solar shading and daylight redirection systems. Those systems might have complex light transmission properties named Bidirectional Transmission Distribution Functions (BTDF) that can be monitored using gonio-photometers or simulated using raytracing tools. Five tools able to simulate CFS were examined in a variant of the refurbished case study of C2. Four kinds of CFS were considered, ranging from clear glass to lasercut panel, and were benchmarked with daylight factor values on the work plane and renderings in sunny conditions. The results showed a large discrepancy in the results for the daylight factor values, indicating the difficulty to simulate daylight likewise in the document C2. The renderings with sunny conditions let the user of the tools appreciate the deviation effect of the lasercut panel for instance, but the obtained images are bound to the intrinsic resolution of the monitored BTDF which may be coarse depending on the source of data. The advanced and future simulation tools can give an interesting indication of the light distribution through CFS, but practitioners should remain aware of the limits of the method using monitored data bound to a defined resolution. The results are satisfactory enough to get an idea of illuminance profiles or even heat transmission, but not for tasks that require a precise luminance distribution such as glare index calculation.

T50 D.1 Building Stock Distribution and Electricity Use for Lighting

Task 50 Subtask D Report D1

May 2016 - PDF 3.21MB - Posted: 2016-09-22
By: Marie-Claude Dubois Additional: Jan de Boer, Arnaud Deneyer , Peter Fuhrmann, David Geisler-Moroder, Anna Hoier, Roman Jakobiak, Martine Knoop, Yasuko Koga, Werner Osterhaus, Bernard Paule, Peter Pertola, Sophie Stoffer, Eino Tetri

This report presents an analysis of the current distribution of the building stock in the nonresidential sector, which allows identifying the most important building types. The report also presents the current average energy intensity for electric lighting for each building type as well as characteristics of existing lighting installations in these buildings. The analysis concludes that five building types cover the largest floor space area:

1. Offices,
2. Educational buildings,
3. Wholesale and retail trade,
4. Industrial buildings,
5. Agriculture buildings.

Three other non-residential building types should be given a second priority:

1. Hotels and restaurants,
2. Hospitals and healthcare,
3. Sports buildings.

Data from Sweden, the Netherlands and the United States indicate that fluorescent lighting is clearly the dominant light source in non-residential premises, that LED lighting is still very scarce and that there are still many incandescent light sources installed in non-residential buildings.

T50 D.2 Daylighting and lighting retrofit to reduce energy use in non-residential buildings: A literature review

Task 50 Subtask D Report D2

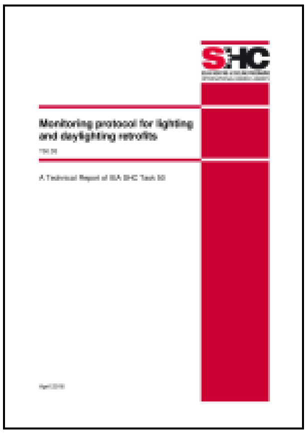
May 2016 - PDF 0.86MB - Posted: 2016-09-22
By: Primary: Marie-Claude Dubois, Niko Gentile Additional: Fabio Bisegna, Martine Knoop, Barbara Matusiak, Werner Osterhaus, Sophie Stoffer, Eino Tetri This report presents a literature review about energy-efficient retrofit of electric lighting and daylighting systems in buildings. The review, which covers around 160 research articles, discusses the following energy retrofit strategies: replacement of lamp, ballast or luminaire; use of task-ambient lighting design; improvement in maintenance; reduction of maintained illuminance levels; improvement in spectral quality of light sources; improvement in occupant behavior; use of control systems; and use of daylighting systems. The review indicates that existing general knowledge about lighting retrofit is currently very limited and that there is a significant lack of information concerning the actual energy performance of lighting systems installed in the existing building stock. The resulting key directions for future research highlights issues for which a better understanding is required for the spread and development of lighting retrofit.

[T50 D.3 Monitoring protocol for lighting and daylighting retrofits]

Task 50 Subtask D Report D3

May 2016 - PDF 1.74MB - Posted: 2016-09-22

By: Marie-Claude Dubois, Niko Gentile, Cláudia Naves David Amorim Additional (in alphabetical order): David Geisler-Moroder, Roman Jakobiak, Barbara Matusiak, Werner Osterhaus, Sophie Stoffer



This document presents a monitoring protocol to assess the overall performance of a lighting and/or daylighting retrofit of a building. This protocol covers four key aspects:

1. Energy use;
2. Retrofit costs;
3. Photometric assessment;
4. User assessment.

This document develops each aspect in detail, presenting the required measurements and necessary equipment as well as providing guidelines for data analysis.

The protocol is written as a general guideline document which could be used by non-expert assessors. A step-by-step general procedure is described, including five main phases, where each phase is described in detail, including the required documentation for two distinct monitoring levels: a 'basic' and a 'comprehensive' monitoring level.

[T50 D.5 Lessons learned from monitoring lighting and daylighting in retrofit projects]

Task 50 Subtask D Report D5

May 2016 - PDF 1.12MB - Posted: 2016-09-22

By: Cláudia Naves David Amorim, Marie-Claude Dubois, Niko Gentile, Werner Osterhaus, Sophie Stoffer Additional: David Geisler-Moroder, Roman Jakobiak, Barbara Matusiak

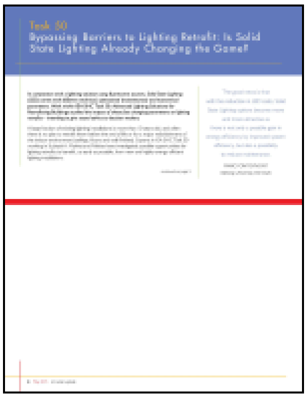
This report presents the general lessons learned from the investigated 24 case studies from 10 countries.

[Task 50: Bypassing Barriers to Lighting Retrofit: Is Solid State Lighting Already Changing the Game?]

May 2015 - PDF 0.24MB - Posted: 2016-03-20

By: Marc Fontoynont

In comparison with a lighting solution using fluorescent sources, Solid State Lighting (LED) comes with different technical, operational (maintenance) and economical parameters. Work within IEA SHC Task 50: Advanced Lighting Solutions for Retrofitting Buildings studied the impact of these fast changing parameters on lighting retrofits – intending to give sound advice to decision makers.



Task Newsletters

IEA SHC Task 50 Newsletter #2

Newsletter #2

June 2016 - PDF 1.99MB - Posted: 2016-06-02

By: Jan de Boer

With the activities in Task 50, we aimed 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. This newsletter presents an overview on key results of IEA SHC Task 50 and provides reference to further information.

IEA SHC Task 50 Newsletter #1

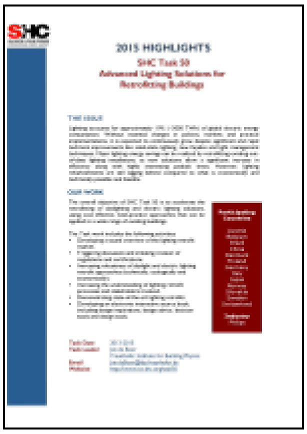
March 2015

March 2015 - PDF 0.69MB - Posted: 2015-04-13

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.

Other Documents

Task 50 Highlights 2015


2015 HIGHLIGHTS
SHC Task 50
Advanced Lighting Solutions for Retrofitting Buildings

Advanced Lighting Solutions for Retrofitting Buildings

April 2016 - PDF 1.21MB - Posted: 2016-04-08

Lighting accounts for approximately 19% (~3000 TWh) of global electric energy 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 façades and light management techniques. Major lighting energy savings can be realized by retrofitting existing out-of-date lighting installations, as new solutions allow a significant increase in efficiency along with highly interesting payback times. However, lighting refurbishments are still lagging behind compared to what is economically and technically possible and feasible.

Task 50 Highlights 2014


2014 HIGHLIGHTS
SHC Task 50
Advanced Lighting Solutions for Retrofitting Buildings

Advanced Lighting Solutions for Retrofitting Buildings

February 2015 - PDF 0.21MB - Posted: 2015-02-12

Lighting accounts for approximately 19% (~3000 TWh) of global electric energy 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 façades and light management techniques. Major lighting energy savings can be realized by retrofitting existing out-of-date lighting installations, as new solutions allow a significant increase in efficiency along with highly interesting payback times. However, lighting refurbishments are still lagging behind compared to what is economically and technically possible and feasible.

Task 50 Highlights 2013


2013 HIGHLIGHTS
SHC Task 50
Advanced Lighting Solutions for Retrofitting Buildings

Advanced Lighting Solutions for Retrofitting Buildings

February 2014 - PDF 0.5MB - Posted: 2014-03-03

Lighting accounts for approximately 19% (~3000 TWh) of the global electric energy 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. Major lighting energy savings can be realized by retrofitting existing out of date lighting installations, as new solutions allow a significant increase in efficiency combined with highly interesting payback times. However, lighting refurbishments are still lagging behind compared to what is economically and technically possible and feasible.

Task 50 Brochure

Advanced Lighting Solutions for Retrofitting Buildings

July 2013 - PDF 1.45MB - Posted: 2013-07-16

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