IEA SHC Task 50:

Advanced lighting solutions for retrofitting buildings

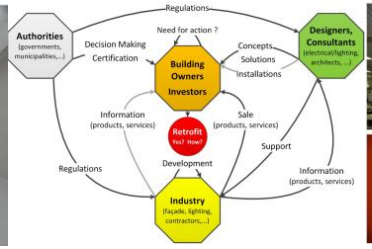
SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

Daylighting

Electric Lighting

Lighting Controls

January 2013 – December 2015



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Lighting and Energy: Potentials in Retrofitting

Only small volume of new building constructions

Geo-reisecommunity

~3% retrofit rate

(estimation facade and lighting industry)

Wikipedia,. Apfel3748

Marquardt

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

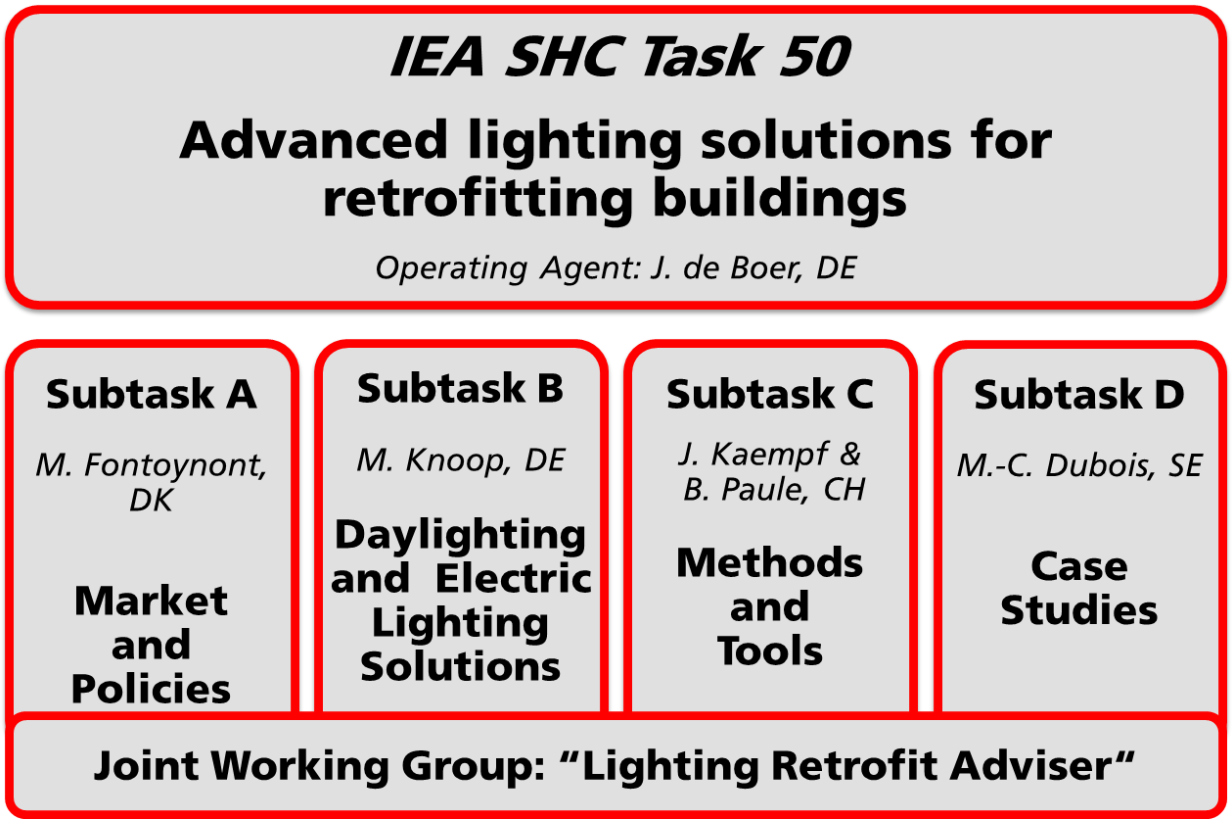
75 % of appliances outdated (older than **25 a**)

“Lighting retrofits can save significant amounts of energy costeffectively”

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

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. Fontoynont, SBI, Denmark]

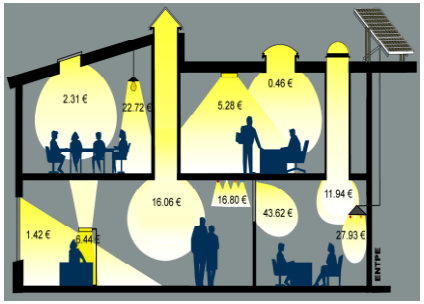
Objective: To understand and model the financial and energy impact associated to retrofitting daylighting and electric lighting of buildings.

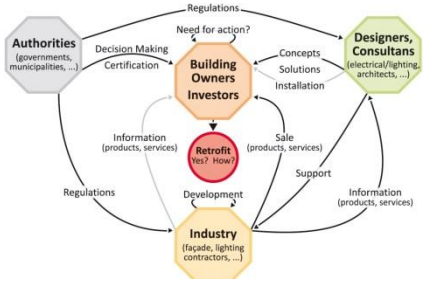
A.1 Global economical models

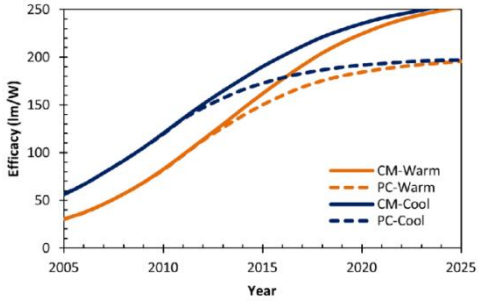
A.2 Barriers and benefits

A.3 Building Energy regulation and certification

A.4 Proposal of action concerning value chain







	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 contrio 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

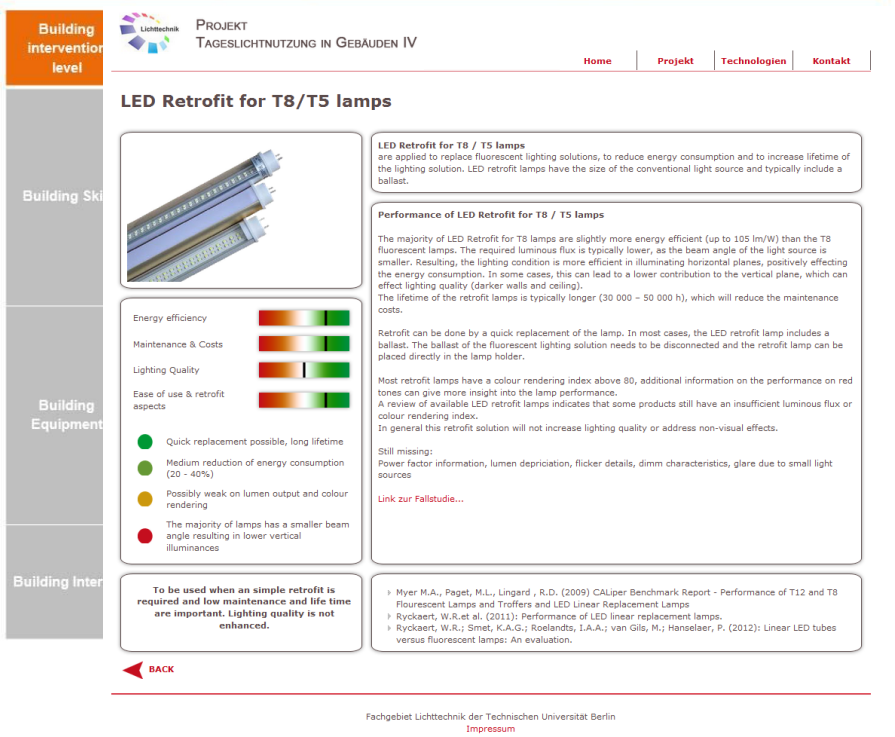
B.2 Definition of (regional) baseline conditions

B.3 Review of state of the art tech-nology and architectural solutions

B.4 New technical developments

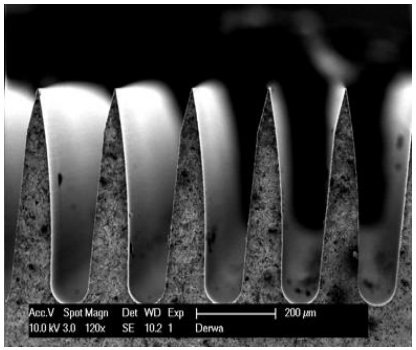
B.5 Measurements of selected state of the art and new technologies

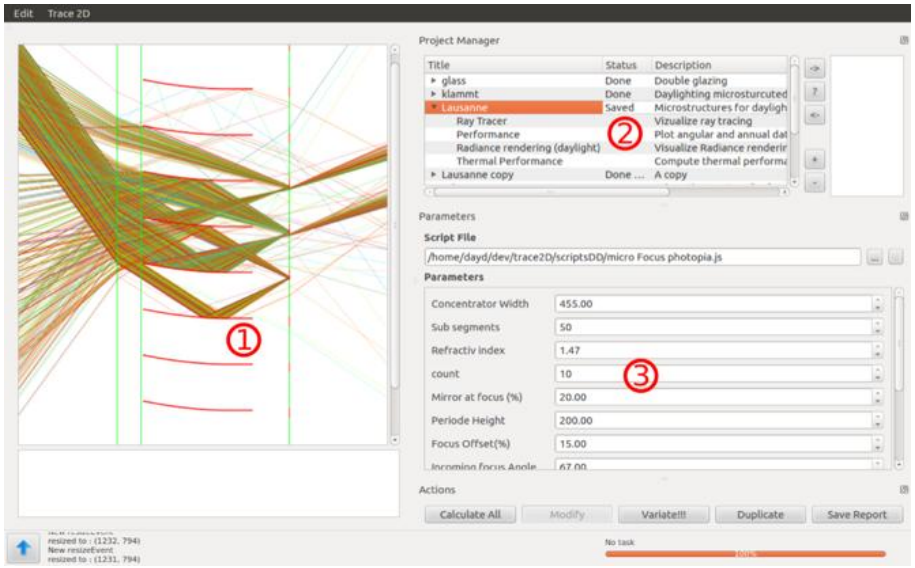
B.6 Source book

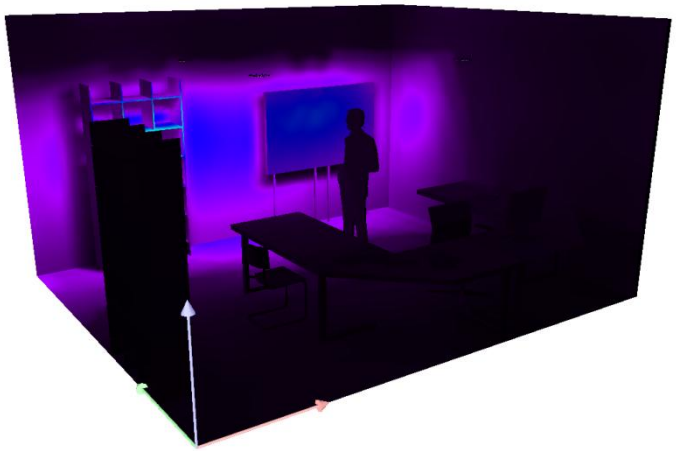


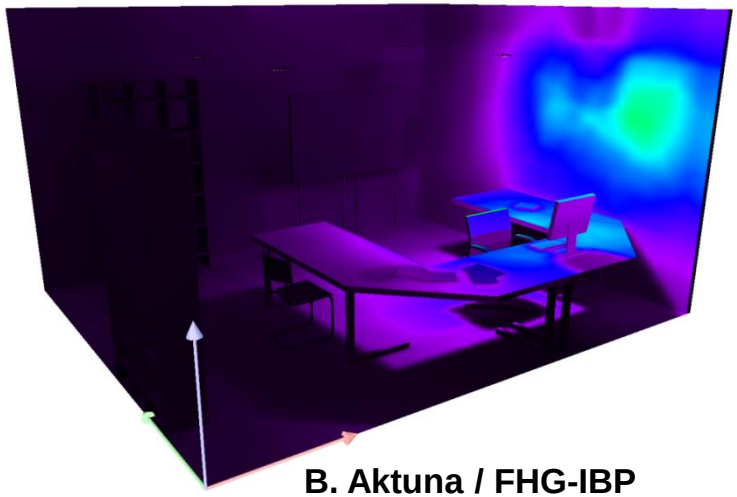
Subtask B: Daylighting and Electric Lighting Solutions

B4: New Technologies: Facade Components & Demand Driven Lighting









A. Kostro / Leso-PB/EPFL

B. Aktuna / FHG-IBP

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.

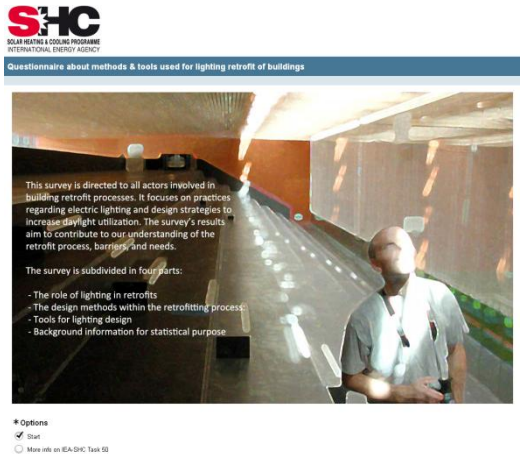
C.1 Analysis of workflow and needs

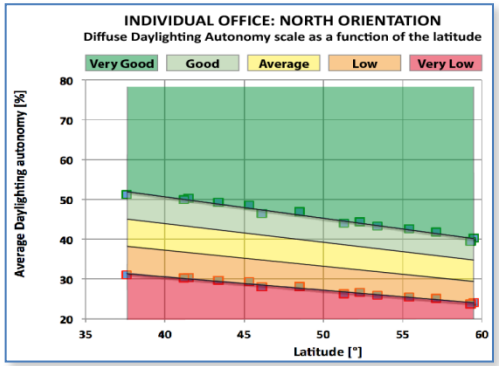
C.2 State of the art review

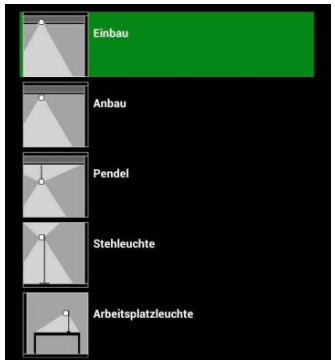
C.3 Development of a simple integrated rating model

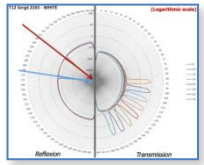
C.4 Energy audit and inspection procedures

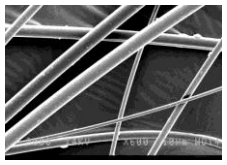
C.5 Advanced and future simulation tools

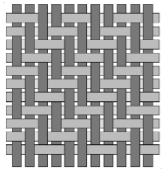


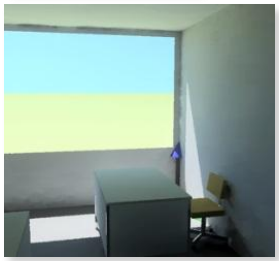












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Subtask D: Case Studies

[Coordination: 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

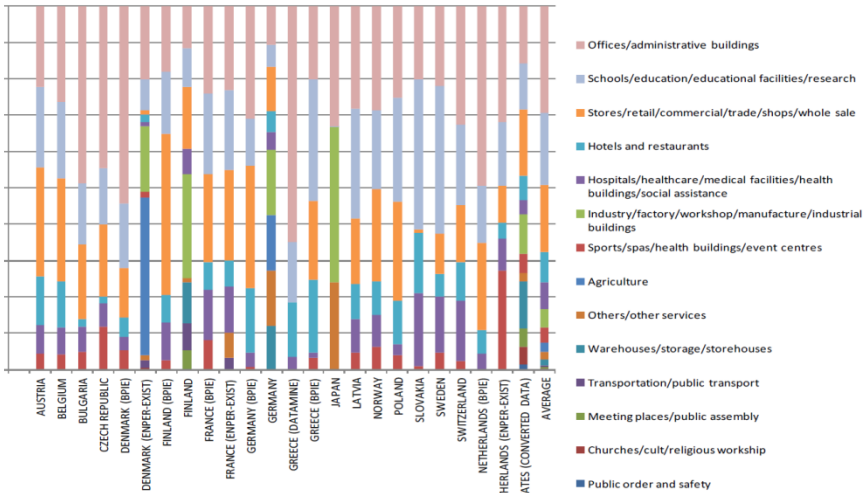
D.2 State-of-the-art review

D.3 Assessment and monitoring procedure

D.4 Case study assessment

D.5 Overall conclusions, lessons learned

D.6 Case study book / e-documentation



Subtask D: Case Studies

D4: Case Study Assessment

NEW Case study buildings, by country

	Country	Category	Name	Location	Notes
	Sweden				
1		Education	E-huset	LTH Campus, Lund	
2		Education	V-huset	LTH Campus, Lund	
3		Education	A-huset	LTH Campus, Lund	
4		Office	(see Peter Pertola)	Stockholm	See PP
5		Office	(see Peter Pertola)	Stockholm	See PP
6		Education	School ?	Helsingborg	See NG
	Denmark				
7		Office	Horsens Town Hall	Horsens	
8		Industry	Alfa Laval building	Ask WO	
9		Education	School		See WO
	Belgium				
10		Office	BBRI	Limelette (Wavre)	Via AD
	The Netherlands				
	Austria				
	Germany				
11		Office	Marquardt Head Office	Rietheim-Weilheim	
12		Education	Uhland-School	Stuttgart	
13		Health Care	Health Care Medical Center	Bad Rappenau	
15		Education	Friedrich-Fröbel-School	Olbersdorf	
16		Office	Ask RJ		
17		Education	School Ask RJ		
18		Retail	Shop Ask RJ		
19		Industry	Workshop Ask RJ		
20		Other	Exhibition space Ask RJ		
	Norway				
21		School buildings	???		See BM
22		Office	???		See BM
23		Campus NTNU	For sure		See BM
	China				

Joint Working Group: Lighting Retrofit Adviser

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

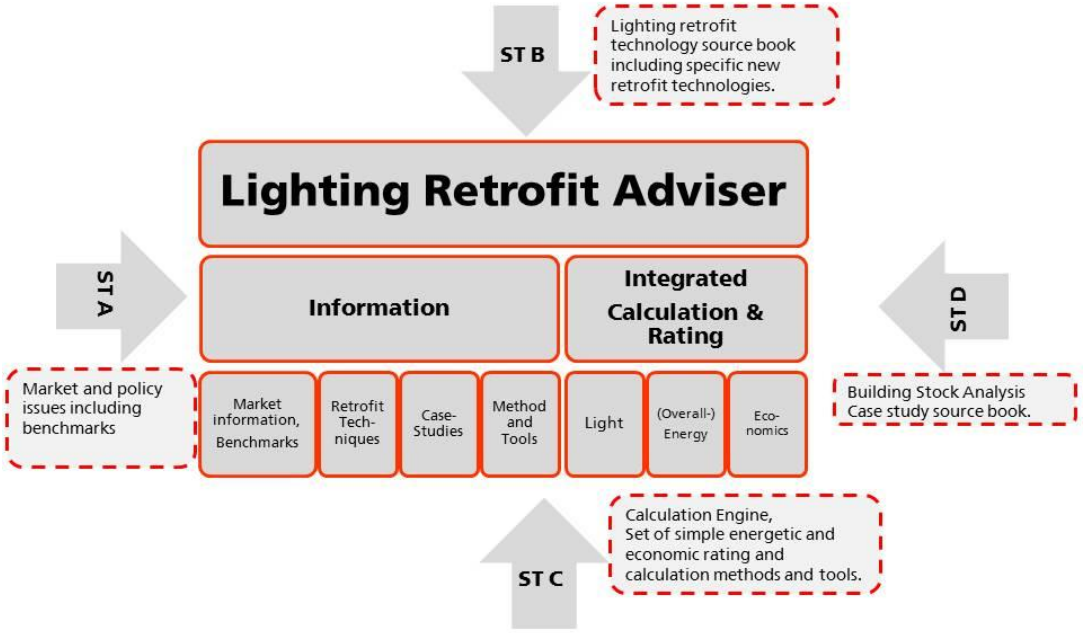
Objective: To develop an electronic interactive source book (Lighting Retrofit Adviser) including and presenting all Task results in an user-friendly and target group specific way

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

Select your Country

You are Investor / Owner

START

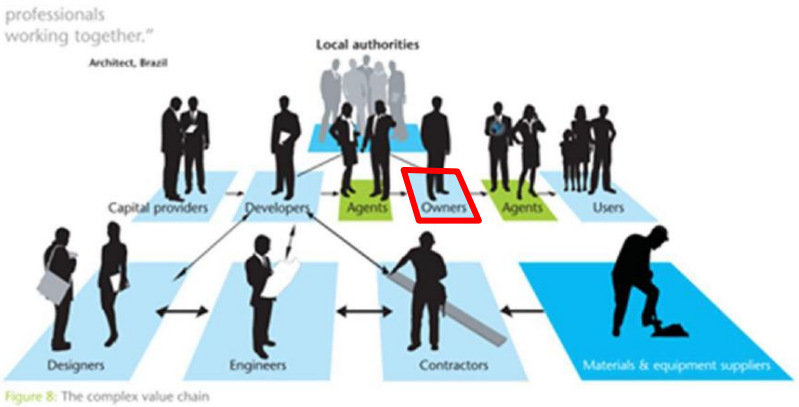


Figure 8: The complex value chain

Identify Potentials

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

Financing

Investigate on financial aspects

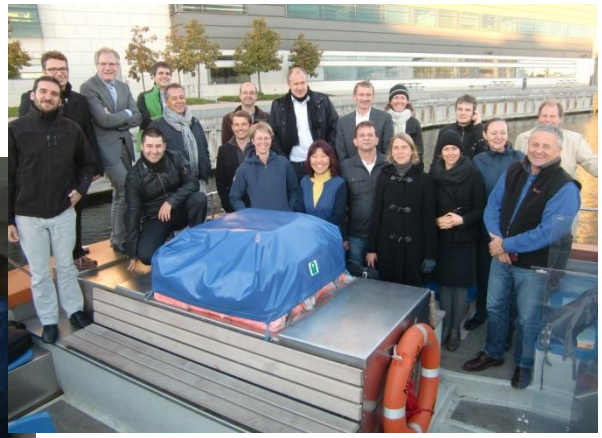
Starting the relighting process

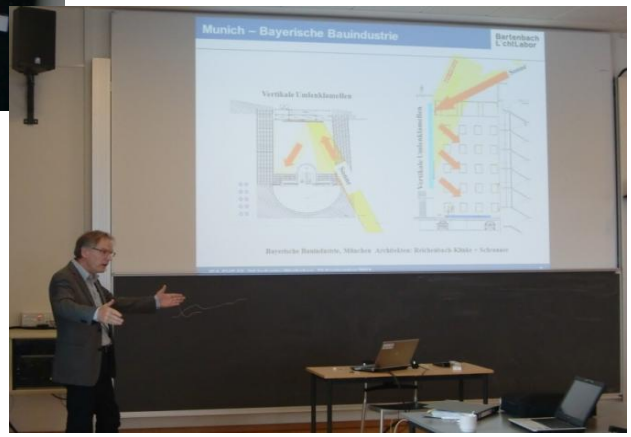
You see it as an opportunity: See recommendations on how to get started

…

- 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.

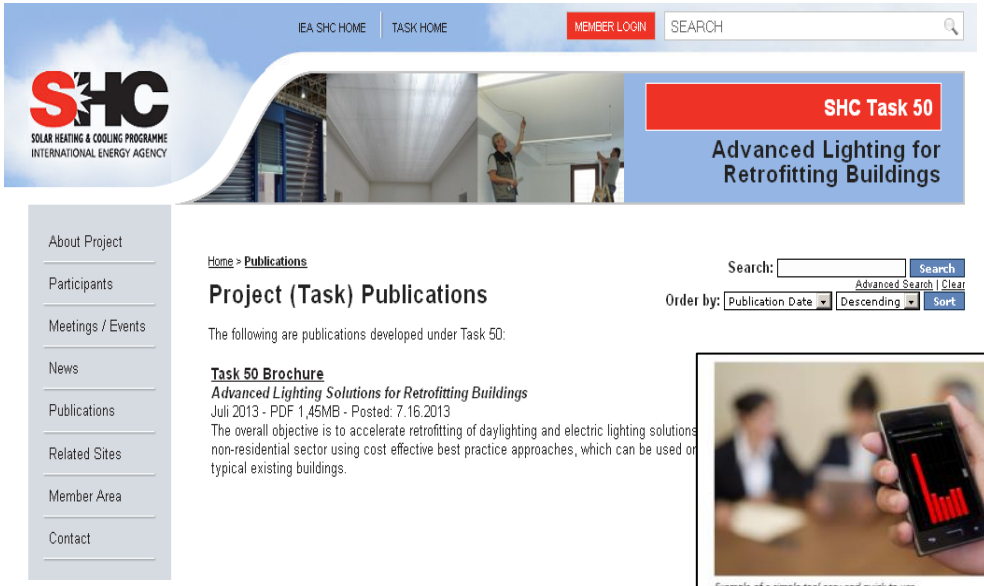
Who is behind the activity …





30 participants
18 universities/institutes/companies
14 Countries

Information & Dissemination



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

„Low hanging fruits“