Searching for adequate retrofit solutions –
how to rate and compare lighting technologies

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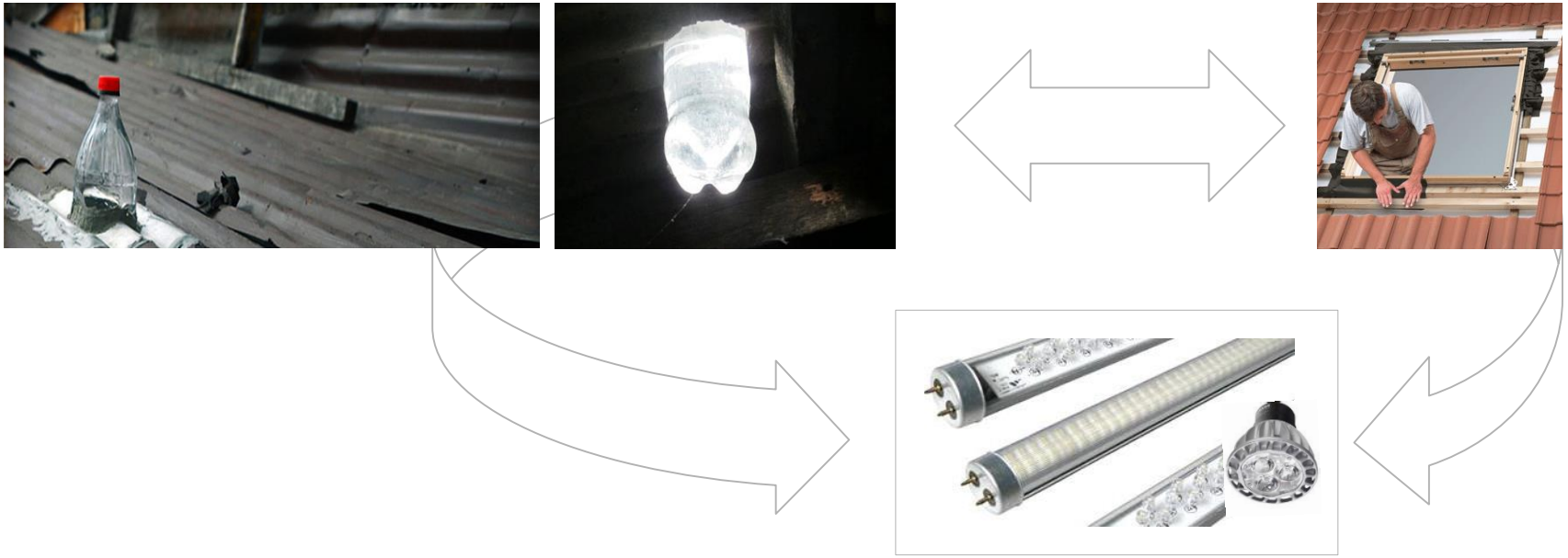
SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

RATE AND COMPARE LIGHTING TECHNOLOGIES

Searching for adequate retrofit solutions –
comparison of retrofit solutions on an equal basis



COMPARE RETROFIT SOLUTIONS: LARGE VARIETY

relamping

redesign

daylighting solutions

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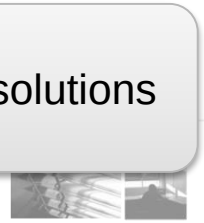
electric lighting solutions

			Intervention type		
level		level	Upgrade of existing situation	Use new components in existing situation	Redesign
		system			
Building Equipment	Electric lighting	Product			
		Control system			
Building Interior	Daylighting + Electric lighting	-			

COMPARE RETROFIT SOLUTIONS: HOLISTIC APPROACH

daylighting solutions

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electric lighting solutions

energy efficiency

&

lighting quality

&

thermal aspects

&

running and inital costs

EXAMPLE:
CRITERIA FOR ENERGY EFFICIENCY

Daylighting

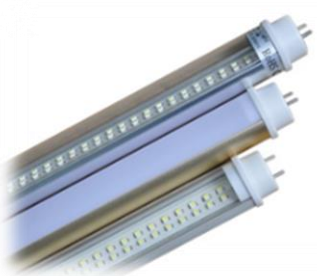
- Energy savings potential
- Light guiding into depth of the room
- Primarily using diffuse skylight
- Primarily using direct sunlight

Electric Lighting

- Energy savings potential
- Efficacy of component
- Directionality
  emitting angle / luminous flux reduction
- Power factor
- Dimmable

	0.00	0.25	0.5	0.75	1.00
energy savings potential	> -30%	-30% - -10%	low potential	10 – 30%	> 30%
light guiding into depth of the room	worse distribution	no	depends on sky condition		yes
primarily using diffuse skylight	no		yes		performs well under both diffuse skylight as well as direct sunlight
primarily using direct sunlight	no		yes		

	0.00	0.25	0.5	0.75	1.00	
energy savings potential	> -30%	-30% - -10%	low potential	10 – 30%	> 30%	50%
light guiding into depth of the room	worse distribution	no	depends on sky condition		yes	30%
primarily using diffuse skylight	no		yes		performs well under both diffuse skylight as well as direct sunlight	10%
primarily using direct sunlight	no		yes			10%



external light shelf	
energy efficiency	0.73
lighting quality	0.51
thermal aspects	0.56

Baseline

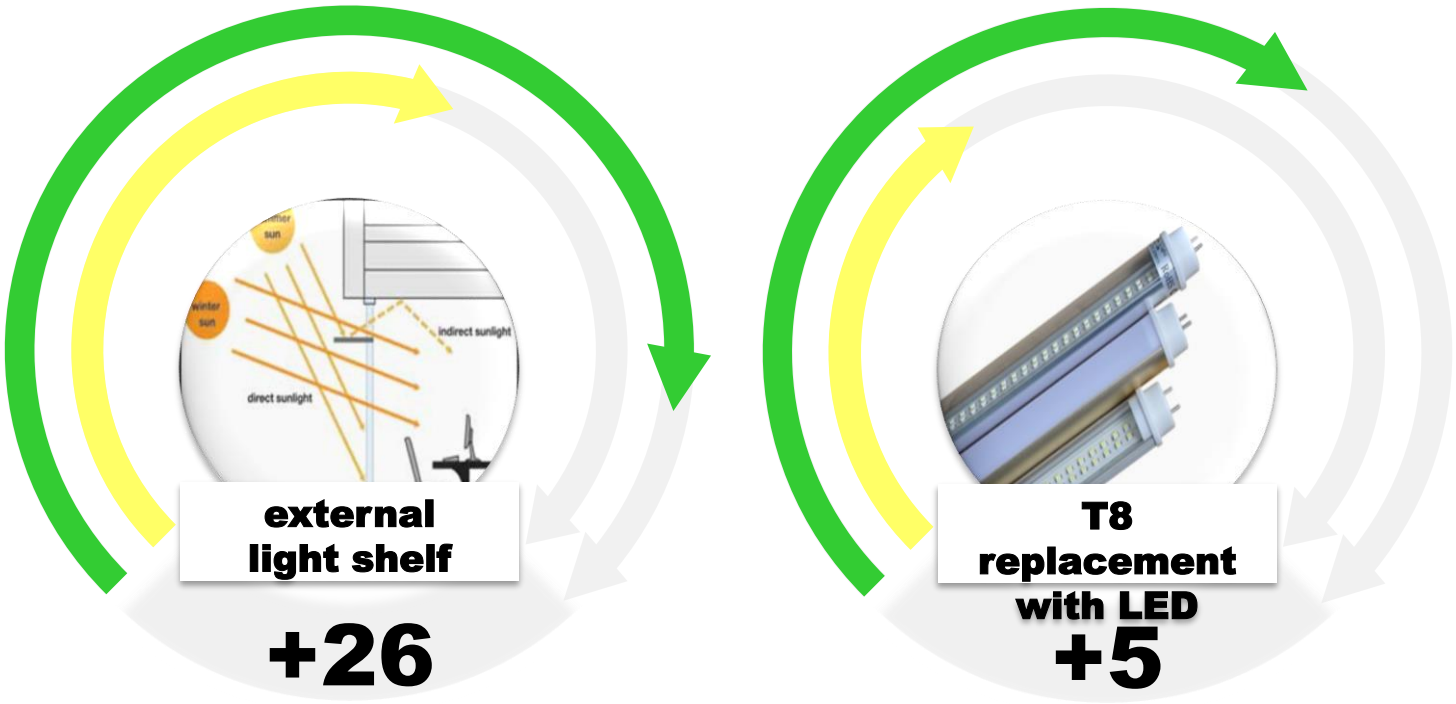
T8 replacement with LED	
energy efficiency	0.73
lighting quality	0.45

comparable

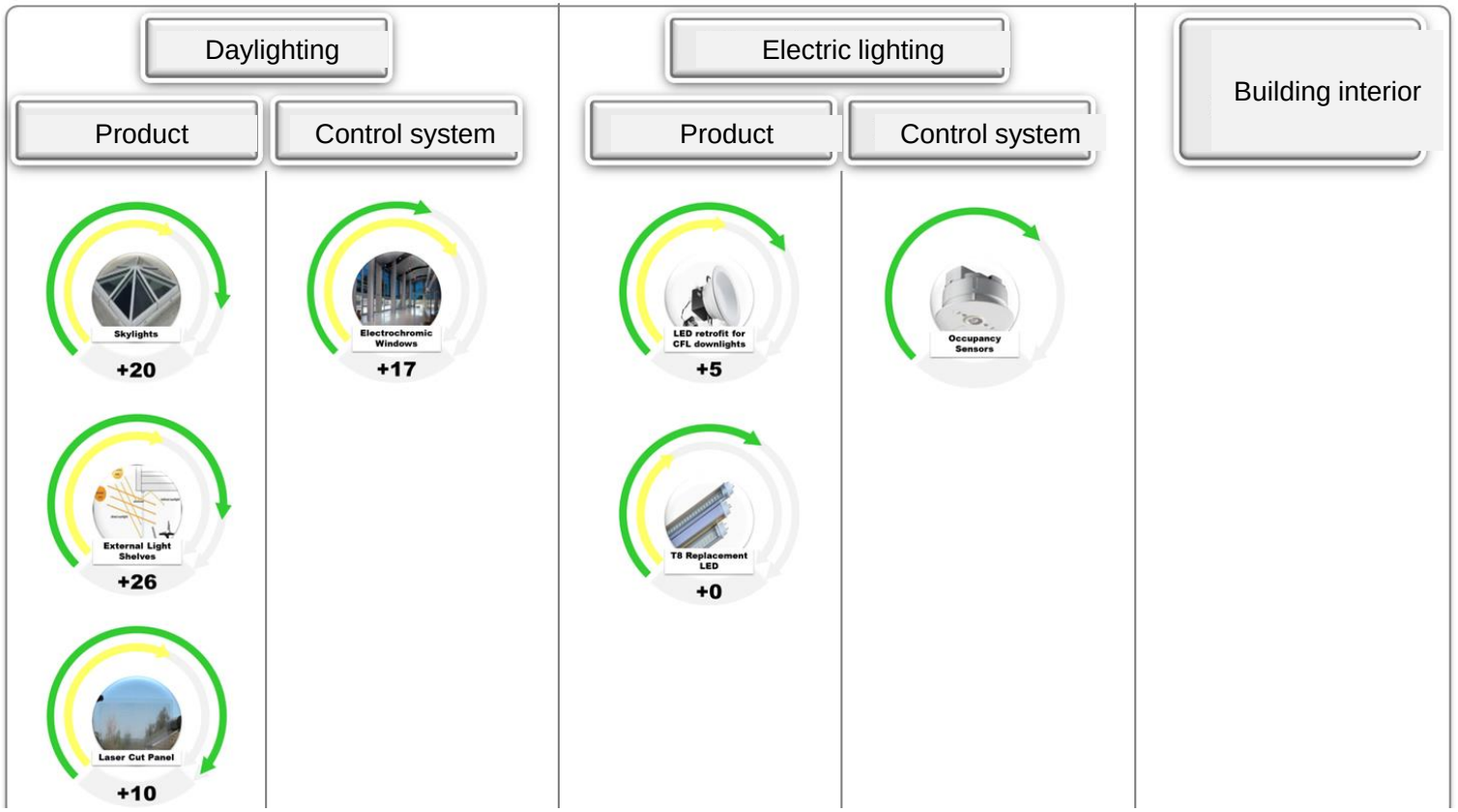
initial costs	0.63
running costs	0.25

initial costs	0.25
running costs	0.19

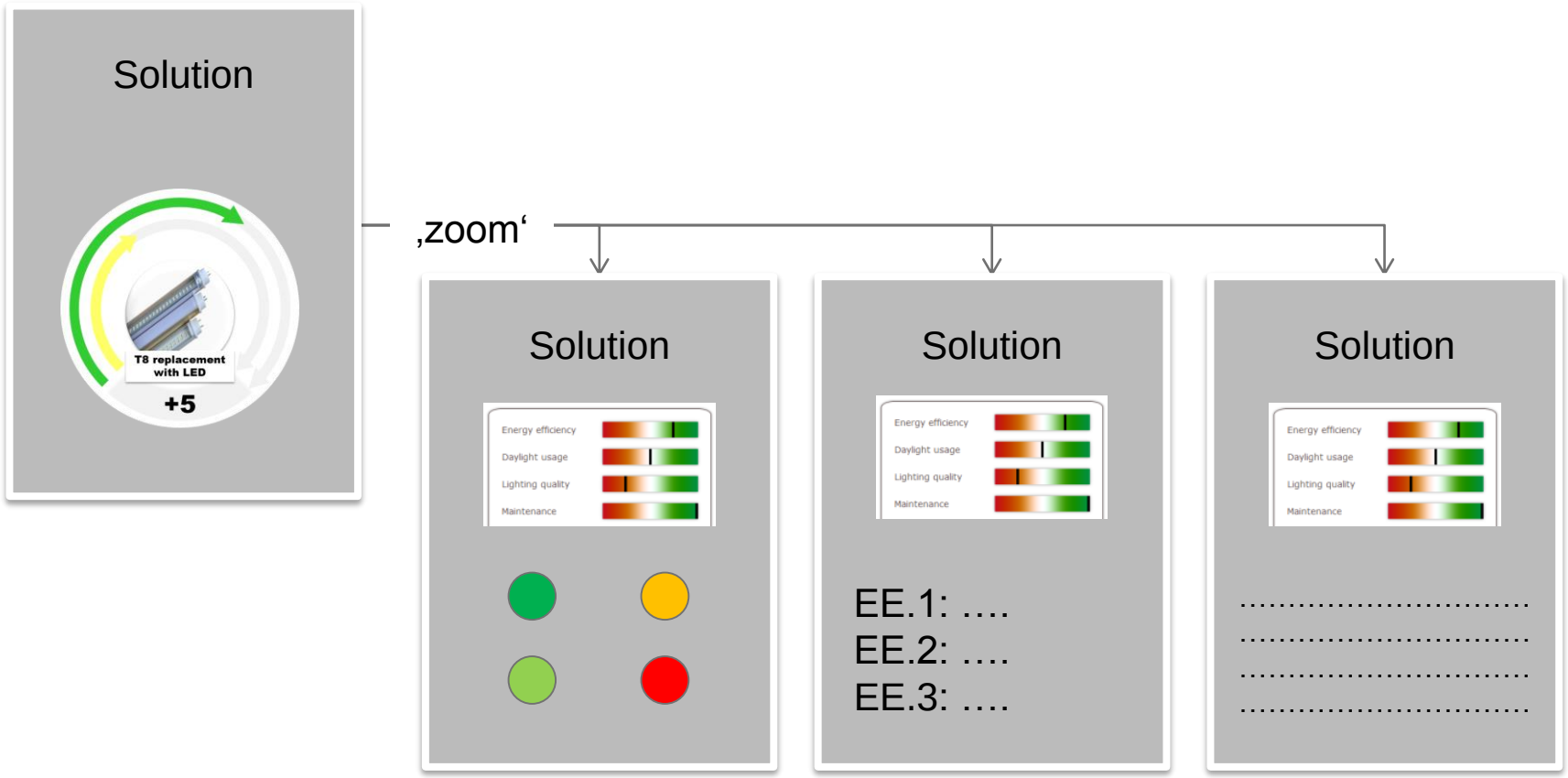
REPRESENTATION



MATRIX OF SOLUTIONS

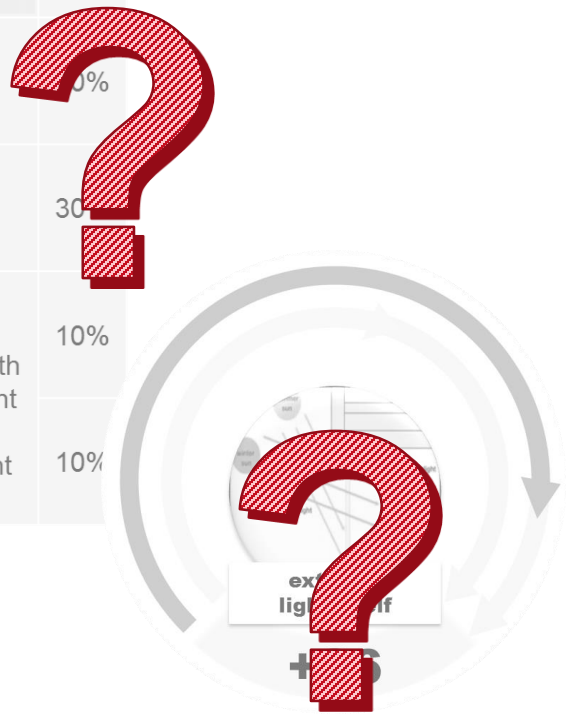


INFORMATION – TARGET GROUP SPECIFIC

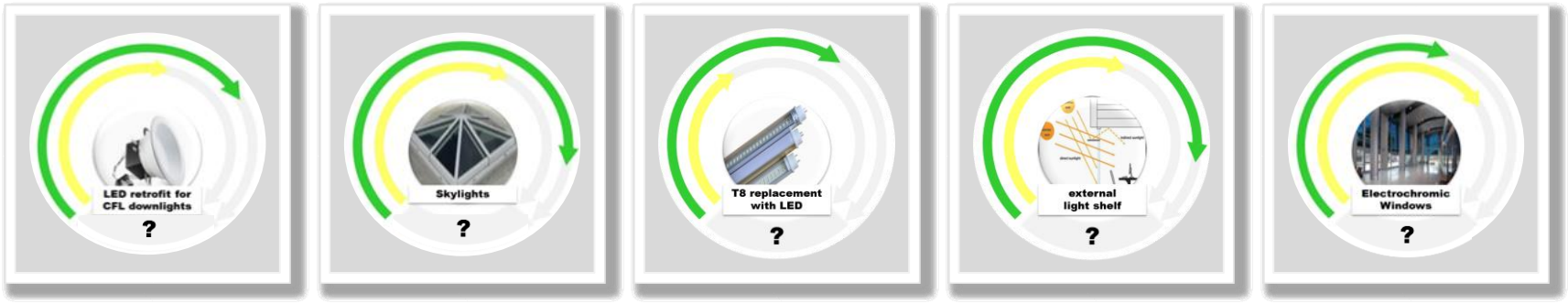


VALIDATION OF APPLICABILITY

	0.00	0.25	0.5	0.75	1.00	
energy savings potential	> -30%	-30% - -10%	low potential	10 – 30%	> 30%	0%
light guiding into depth of the room	worse distribution	no	depends on sky condition		yes	30
primarily using diffuse skylight	no		yes		performs well under both diffuse skylight as well as direct sunlight	10%
primarily using direct sunlight	no		yes			10%



EXPERT WORKSHOP:
TASK MEETING AND ONLINE QUESTIONNAIRE



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