



LED

Light in Public Space



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About the project

LED Light in Public Space:

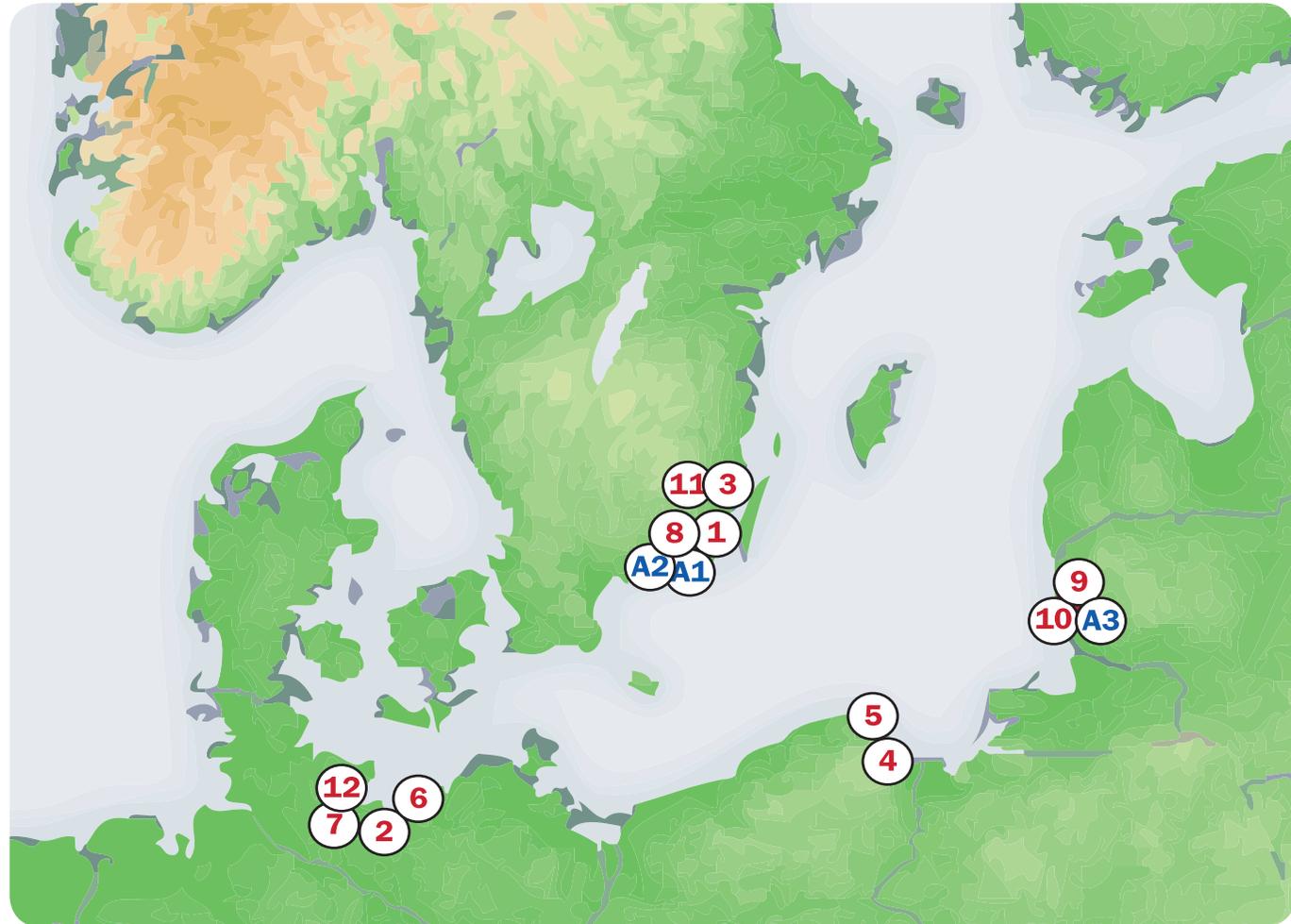
EU-project running from 2009 to 2012 and involves 15 partners in the South Baltic Region

Project Partners

- P1 City of Kalmar, Sweden
- P2 Bad Doberan County Council, Germany
- P3 Municipality of Oskarshamn, Sweden
- P4 City of Gdansk, Poland
- P5 Institute for European Initiatives, Poland
- P6 Hanseatic City of Rostock, Germany
- P7 University of Applied Sciences Wismar, Germany
- P8 Linnaeus University, Sweden
- P9 University of Klaipeda, Lithuania
- P10 Public Institution Strategic Self-management Institute, Lithuania
- P11 Energy Agency for South East Sweden, Sweden
- P12 Hanseatic City of Wismar, Germany

Associated Partners

- A1 Kalmar Energi Elnät AB, Sweden
- A2 Sustainable Sweden Southeast AB, Sweden
- A3 Lighting of Roads, Klaipeda, Lithuania



Aim: to provide facts for a conversion of public space lighting to versatile LED technology, based on a pedestrian perspective and other quality criterias.

About the project

Objectives

— Promotion, information and education about LED lighting

The project targets:

- politicians
- civil servants
- officials in municipalities and regions
- private companies/producers
- the general public

— Technology and design - user's needs

- Defining and help responding to the “user’s needs” considering the combination of LED technology and design potential
- Cluster building between researchers, staff of light fitting producers, civil servants and decison-makers for knowhow exchange

— LED lighting in the context of city planning and road planning

light installations in the cities based on the latest LED technology and user’s needs



Pilot installations

Kalmar → LED lighting of bicycle/pedestrian roads and at roundabouts

Bad Doberan → light around a kindergarden

Oskarshamn → wind and battery operated LED-pole

Gdansk → cultural heritage building illumination in the old town of Gdansk

Rostock → green park lighting

Wismar → LED light installations in a school area, including the path to the parking area



Germany _Bad Doberan: light around a kindergarden

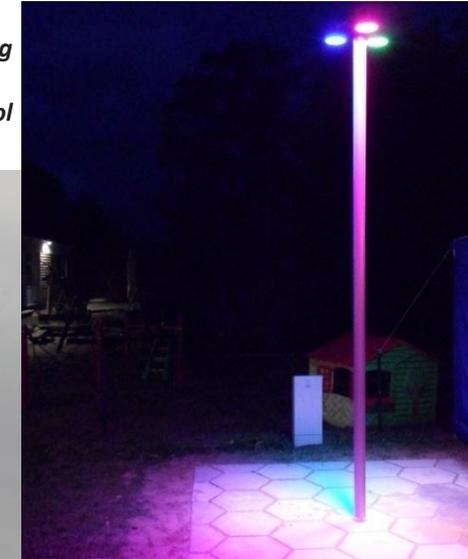


Flexible LED-lines for backlighting the name boards of the kindergarden, Osram, 80 W, 3.300° K



Children's game with colour mixing

Sill RGB-spots with light control for colour mixing, 3 x 80 W



LED-lines for path lighting, 4 x 9 W, 3.300° K



LED information board with RGB-spots with light control for colour mixing

Demonstration of different white light, warm white 3000° K, neutral white 5000° K and cold white 6500° K

Effizienzvergleich

Leuchtmittel	Effizienz
Leuchtstofflampe	~100
Energiesparlampe	~80
Halogenlampe	~20
Glühlampe	~10

Lebenserwartung

Leuchtmittel	Lebenserwartung (h)
Leuchtstofflampe	~10000
Energiesparlampe	~10000
Halogenlampe	~2000
Glühlampe	~1000

LED-Technologie
hohe Effizienz
hohe Lebensdauer

Bauprinzip einer LED

- Halbleiter = LED-Kristall
- Substrat = Kristallträger
- Golddraht = Elektrode
- Leiterplatte
- Kunststoffumhüllung

Farbtemperatur

- Neutralweiß 5000° Kelvin
- Kaltweiß 6500° Kelvin
- Warmweiß 3000° Kelvin

LEDs werden in immer mehr Bereichen der Innen- und Außenbeleuchtung eingesetzt. Beispielsweise in der Straßenbeleuchtung. In Zukunft werden LEDs immer mehr Beleuchtungsaufgaben übernehmen. Die schnelle Weiterentwicklung der LEDs sorgt dafür, dass sie noch effizienter - aber auch preiswerter werden. Mit LEDs kann man sowohl warmes als auch farbiges Licht erzeugen. LEDs, die die Farben weicher können, bestehen aus mehreren kleinen LEDs in einem Gehäuse.

Die Vorteile von LEDs:

- weniger Energieverbrauch
- hohe Lebensdauer
- ca. 1 Mio. Schaltzyklen
- geringere Wärmereizung
- dimmbare
- gute Farbdarstellung im Licht der LED
- warmweißes, neutralweißes oder kaltweißes Licht nach Bedarf
- unempfindlicher gegenüber Erschütterungen

Landkreis Rostock
Außenstelle Bad Doberan

Poland _Gdansk: The art installation 'Amber Drops'



No.	Question	The scale of importance				
		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	The 'Amber Drops' installation contributes to the dissemination of information about LED technology.	1	2	3	4	5
2	The 'Amber Drops' installation promotes the Lower Town district.	1	2	3	4	5
3	The LED lights are not blinding, if you are looking in their direction.	1	2	3	4	5
4	The LED lights illuminate the space under the bridge.	1	2	3	4	5
5	Installed LED lights improve safety under the bridge.	1	2	3	4	5
6	I am pleased that the space under the bridge has been regenerated.	1	2	3	4	5
7	The 'Amber Drops' installation creates a pedestrian-friendly space to stop and rest.	1	2	3	4	5
8	The 'Amber Drops' installation is a worth-seeing tourist attraction.	1	2	3	4	5
9	Information board about the LED project is noticeable and legible.	1	2	3	4	5

Questionnaire

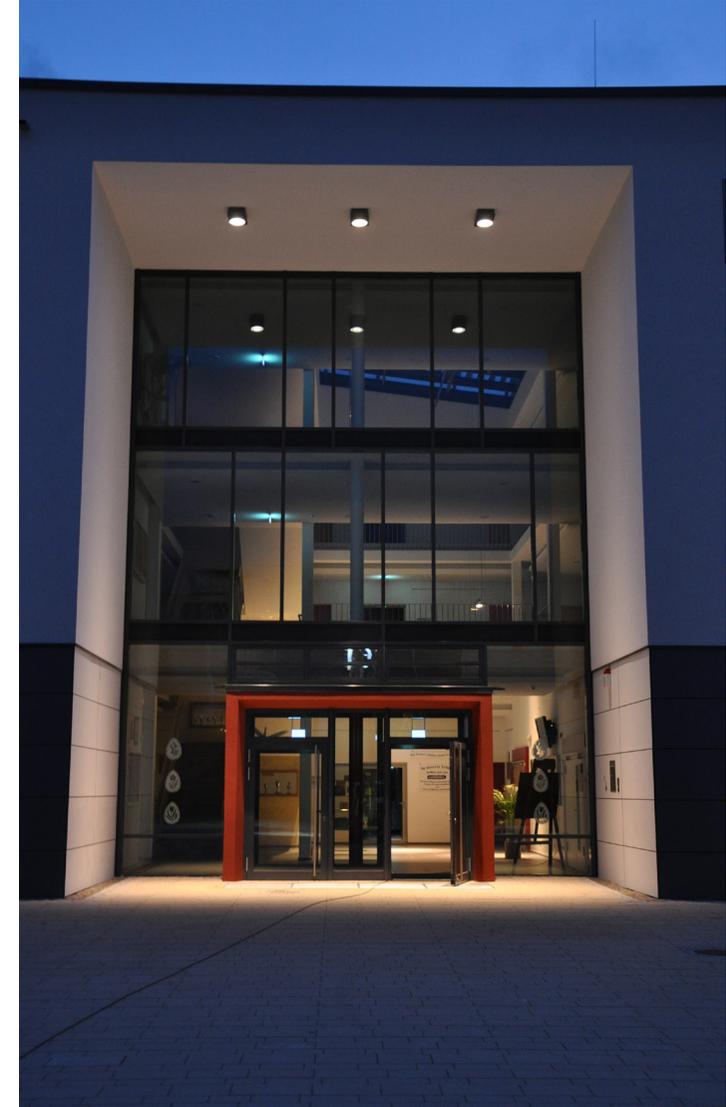
Pilot installations

Germany _Wismar: LED light installations in a school area, including the path to the parking area



Pilot installations

Germany _Wismar: LED light installations in a school area, including the path to the parking area



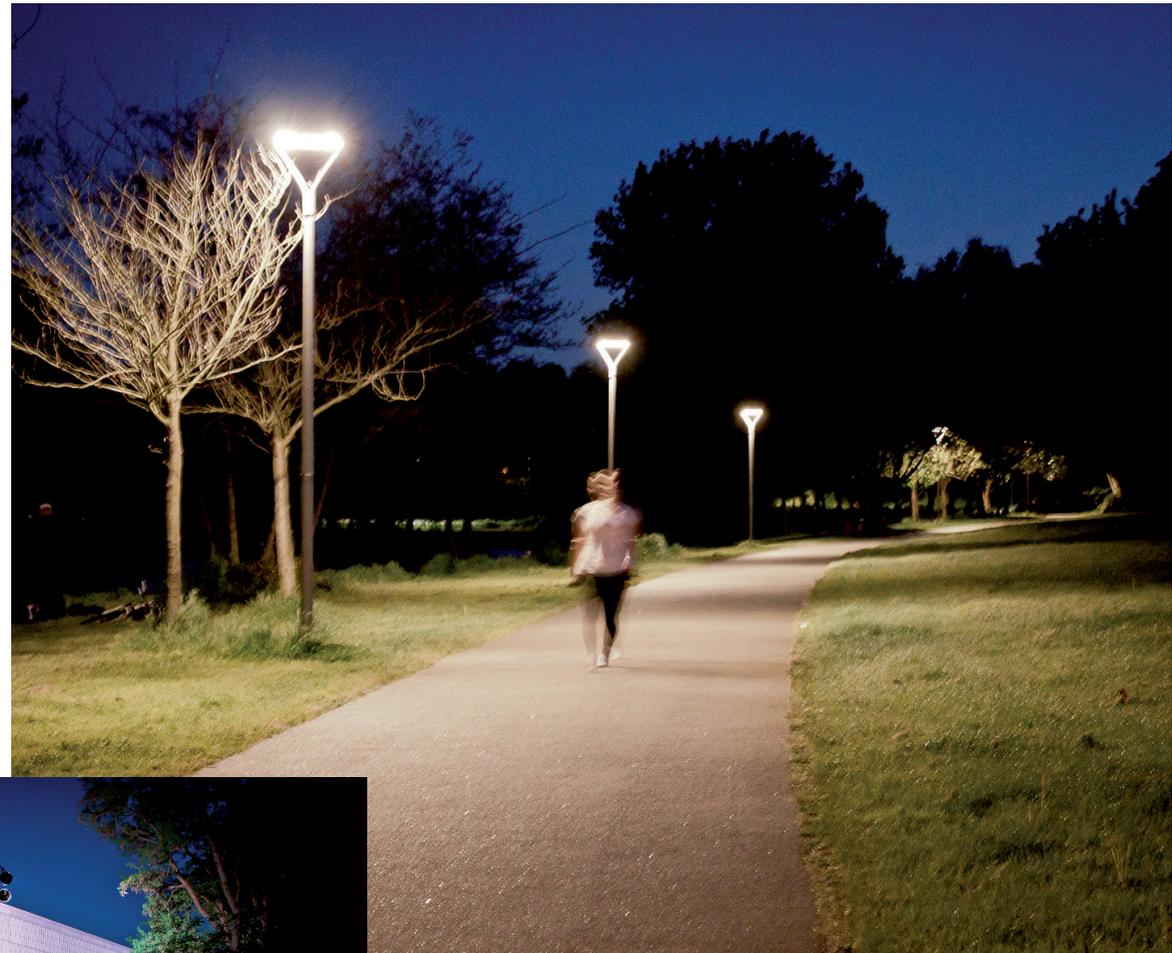
Germany _Rostock: green park lighting



old mercury lamp 89 W – 52 pieces



new LED-Lamp 29 W - 37 pieces



User's Needs and Demands in different environments

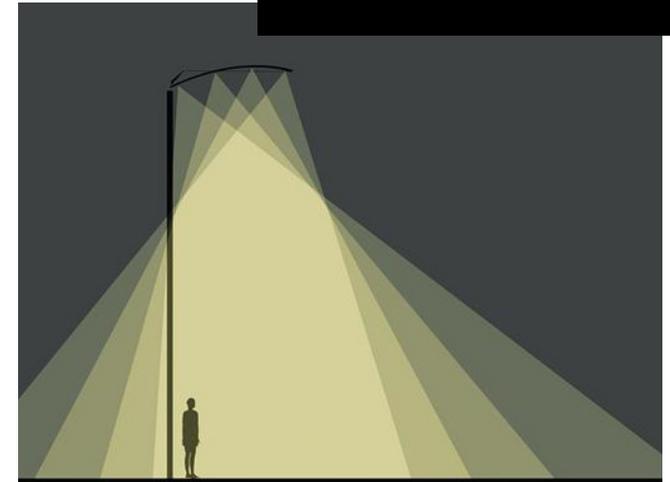
- LED project → surveys analyzing the use of the installations regarding:

- the location
- different users → Who is using the space?
- different times of use → At what time?
- the different types of uses → In what way? / For which purpose?



- LED project → Specific needs suggested in different countries/regions

- The needs are in general similar in the different regions.
- The installations in the different countries represent different approach.



_ German approach → focuses on functional, practical, aesthetic factors

_ Swedish approach → focuses on functional, practical, aesthetic factors but also social aspects and lighting product/system development

_ Polish approach → installation with a clear artistic approach for renewing of a specific urban space

_ Lithuanian approach → focuses on urban renewing stress clearly energy and sustainable effects

Differences: the character of the selected urban sites and the design approach than real principal regional differences.

Lighting quality factors for the design of a lighting installation

_ Dynamic

need of lighting changing related to seasons, time of the day, activity, the group of users specific requirements

_ Colour rendering

need of natural colour rendering

_ Colour temperature

need of mainly warm colour temperatures

_ Brightness

possibility of limitation of brightness by natural colour rendering and appropriate colour temperature

_ Light distribution

LED-technique offers a more precise distribution of light and assumes a more accurate design.

_ Glaring

risk of discomfort and disability glare are increasing by LED-technology

More shielded luminaires and a more careful lighting planning are the main factors for avoiding the problem.

lighting design qualities ↔ human beings needs & behavior

User's Needs and Demands → Standard development for public lighting

_ Existing standards: measurable lighting parameters

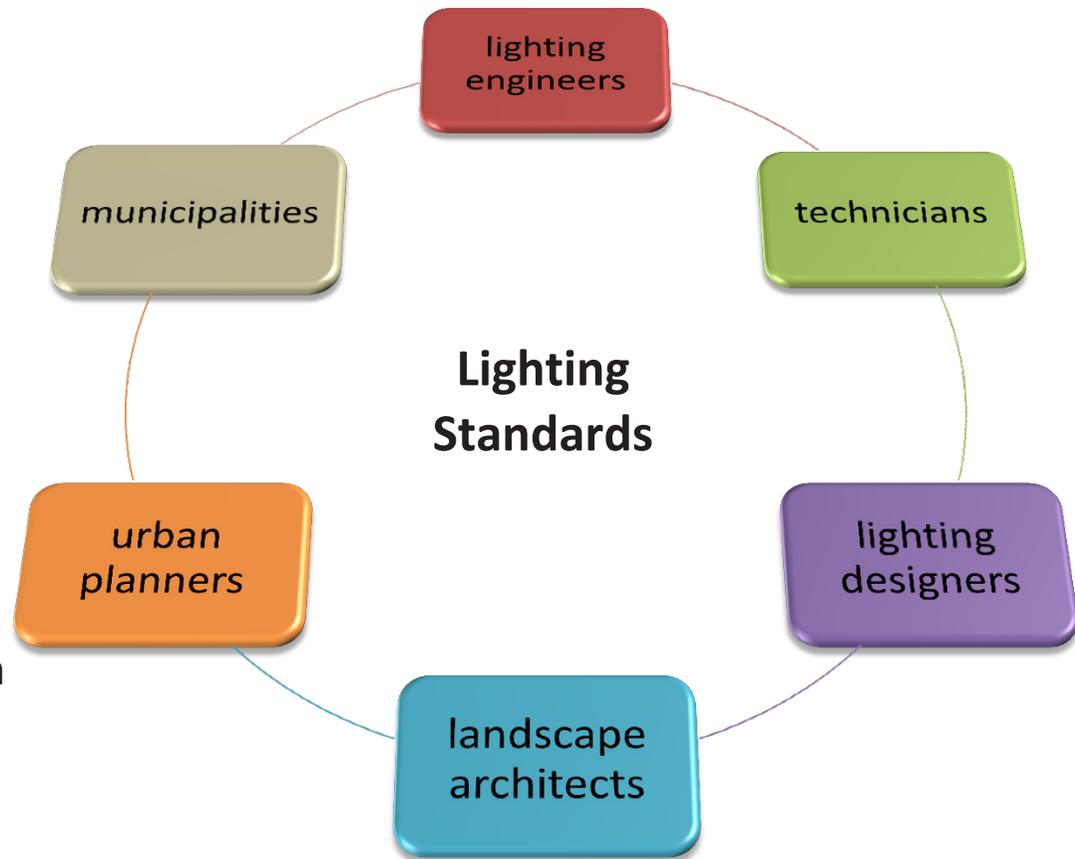
- *Do they represent user's experience?*
- Do they support the new technology of LED?*

_ Analysis of existing standards

_ Discussion of new standards by a humanistic approach

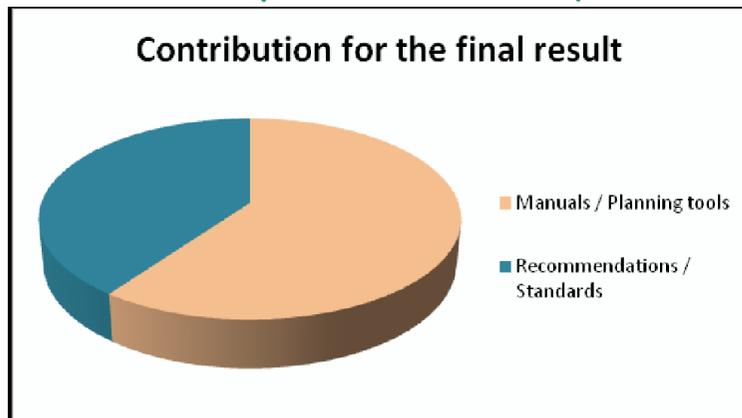
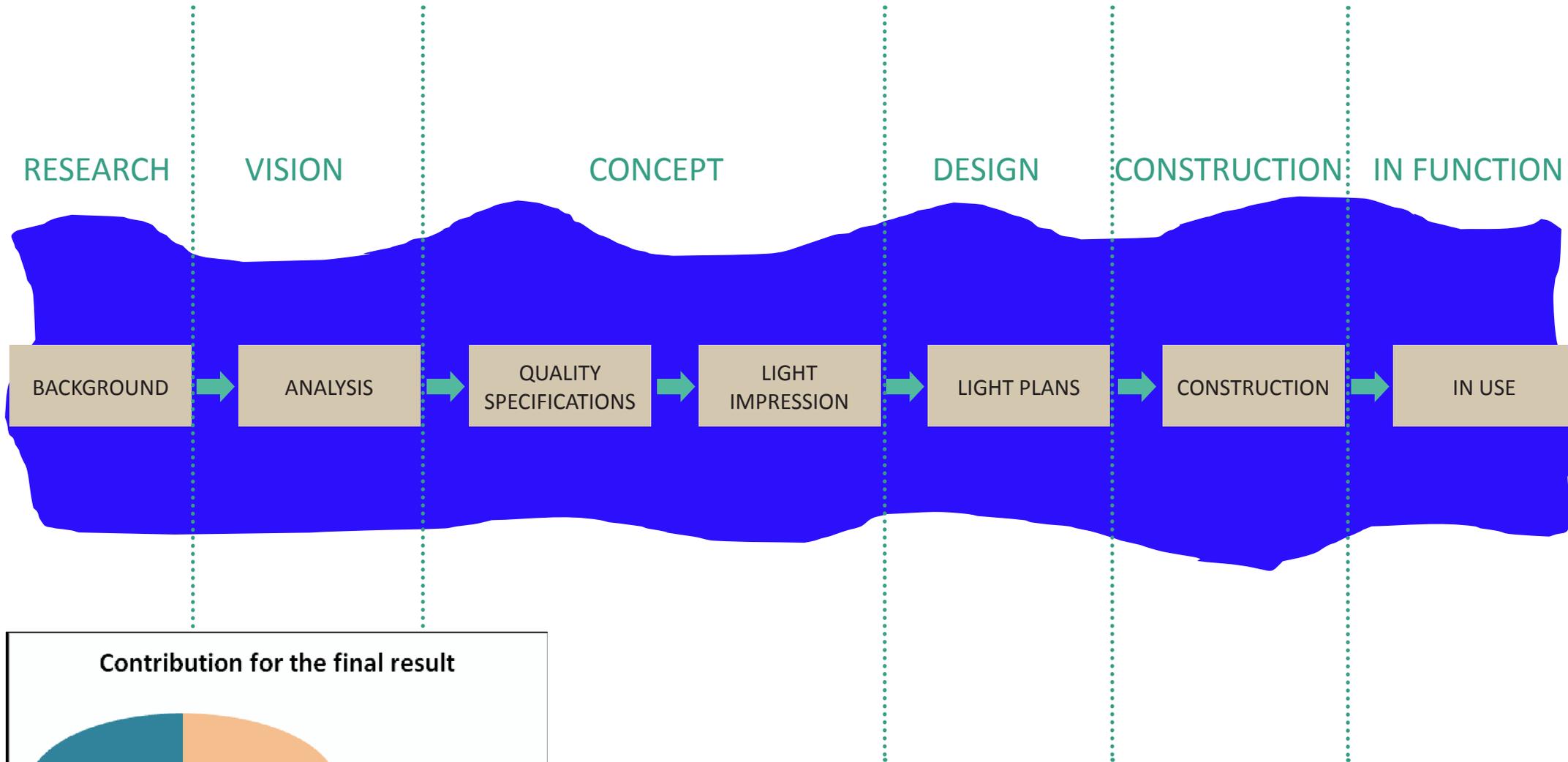
_ Recommendations of new fields and techniques focusing on the final user

<the person that circulates in the urban space>



Development of design manuals and planning tools

_ Structuring the phases of the LIGHTING DESIGN PROCESS



Lighting Design Process

FRAMING FACTORS

TOOLS Calculation formulas Sketches/Drawings Computer aids Tests References Mock ups

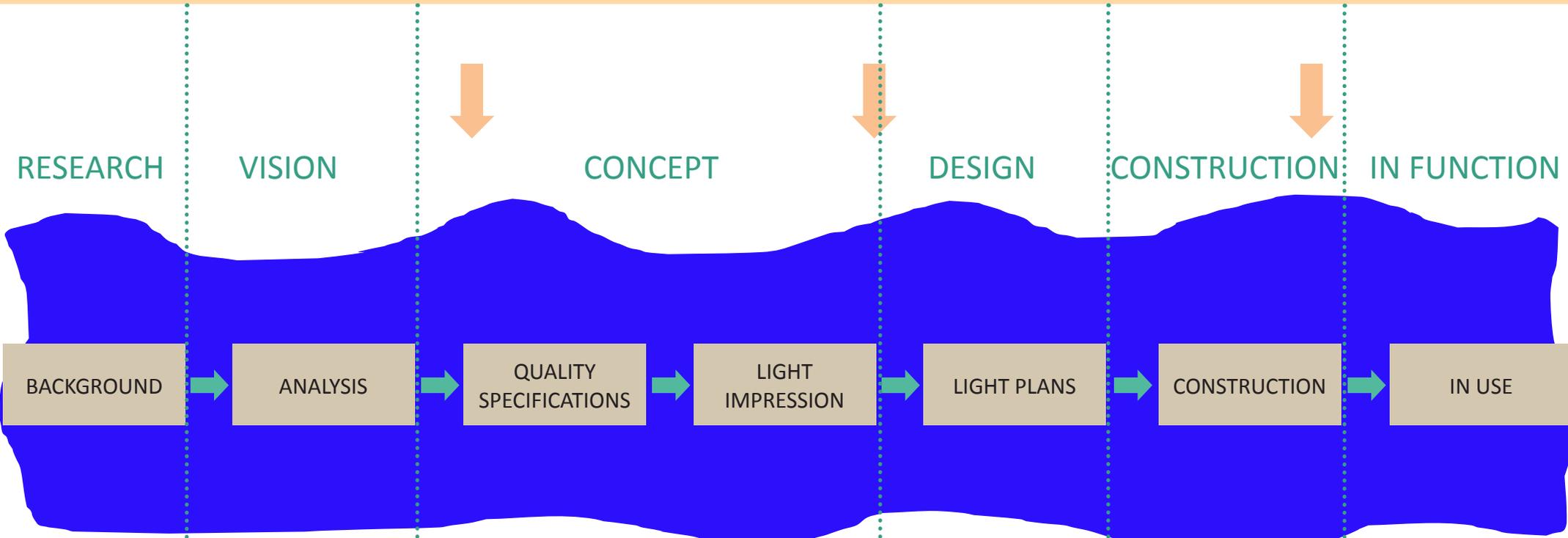
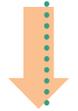
RESEARCH VISION CONCEPT DESIGN CONSTRUCTION IN FUNCTION

PROCESS FACTORS

BACKGROUND → ANALYSIS → QUALITY SPECIFICATIONS → LIGHT IMPRESSION → LIGHT PLANS → CONSTRUCTION → IN USE

FRAMING FACTORS

ADMINISTRATION Economy Management Agreements Standards Energy Maintenance Ecology-Light pollution





THANK YOU!
TACK!