

Interreg

CENTRAL EUROPE



Dynamic Light

European Union
European Regional
Development Fund

TAKING
COOPERATION
FORWARD



Susice | 26. April 2019



DYNAMIC LIGHTING IN ROSTOCK



Dynamic Light | Hanseatic and University City of Rostock | Stephanie Latki



AGENDA

1.
LIGHTING
SITUATION

2.
TEST
IMPLEMENTATION

3.
PILOT
INSTALLATION

4.
OUTLOOK



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2.
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IMPLEMENTATION

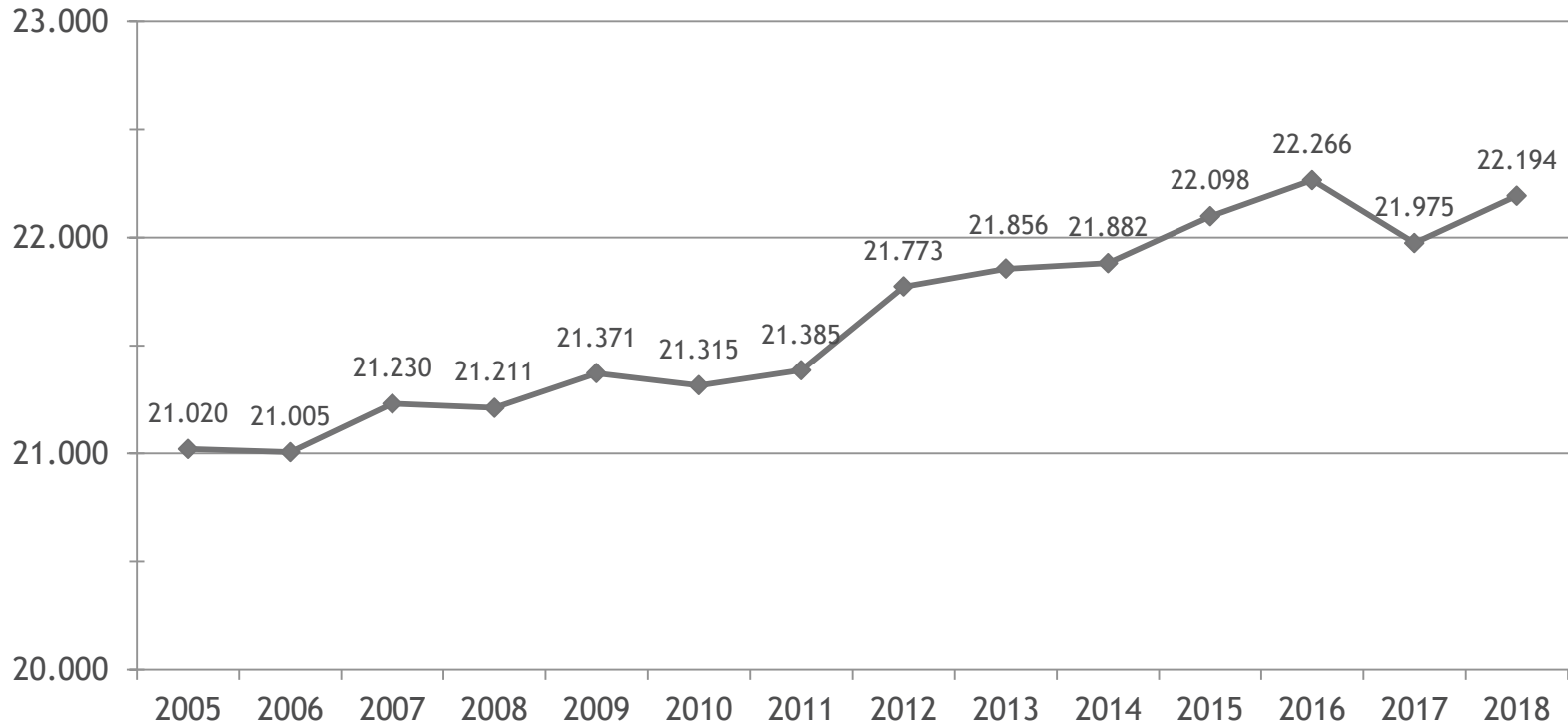
3.
PILOT
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OUTLOOK



LIGHTING SITUATION

LUMINAIRE INVENTORY

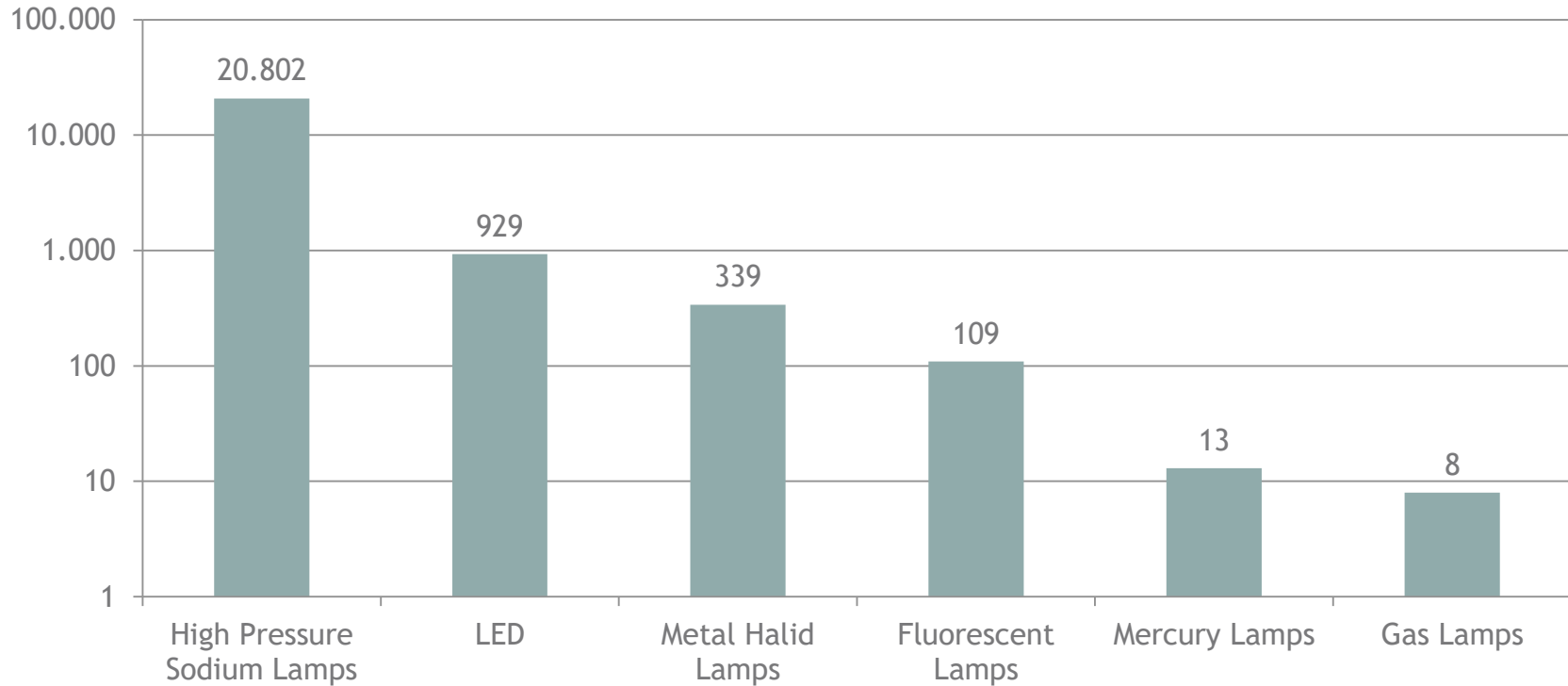


- increased need for security of the citizens
- additional illumination of bicycle and park paths
- development of new residential and commercial areas
- take over of private areas through the municipality



LIGHTING SITUATION

LUMINAIRE STOCK

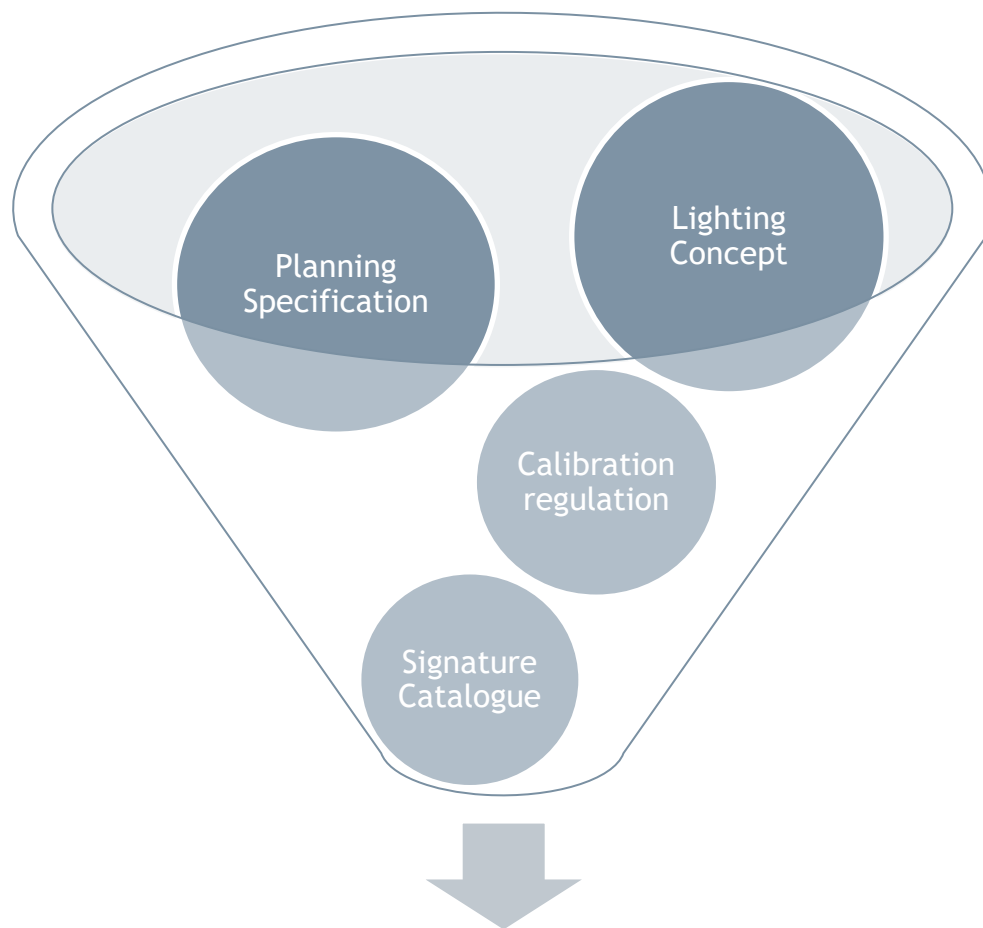


- 95 % NAV luminaires are gradually being replaced by LEDs
- fluorescent lamps are used in tunnel and bridge areas
- metal halide lamps are used for special applications e.g. spotlighting



LIGHTING SITUATION

INTERNAL SPECIFICATIONS



PLANNING AND IMPLEMENTING
OF LIGHTING SYSTEMS

LIGHTING CATALOGUE/CONCEPT

... serves as a handbook for the implementation of public lighting in Rostock & contains all necessary regulations & requirements

PLANNING SPECIFICATION

... prior condition for planning, modification or enlargement of the lighting installations

CALIBRATION REGULATION

... is used for the documentation of the surveying services & for the creation of inventory documents

SIGNATURE CATALOGUE

... serves the standardized design of signatures in the GIS system



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DYNAMIC LIGHTING

TEST IMPLEMENTATION

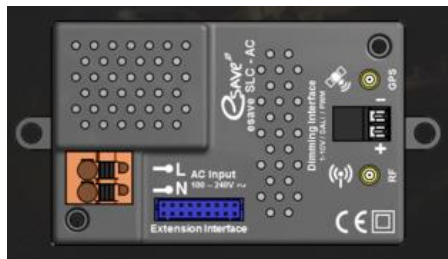
TEST IMPLEMENTATION AT PARK PATH „KRINGELGRABEN“

- 250 m park path
- 5 techn. LED luminaires
- dynamic lighting control with radar sensors



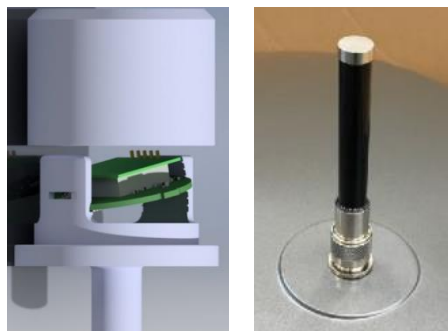
Alfons I FF LED





CONTROLLING

- continuous dimming
- in combination with a motion sensor, only the sections in which people or vehicles move are illuminated brightly



SENSORS

- infrared sensor
- radar sensor



COMMUNICATION (Gateway)

- small device attached near the system connects to wlan
- data from all gateway modules can be combined & operated in a web application
- alternatively - use of a USB dongle (no follow-up costs)



- significant savings up to 50 %
- PIR: small detection area → extension by radar sensor possible
- RADAR: high ground speed necessary
- combination of radar & infrared sensor → not economical



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PILOT ACTION

PILOT LOCATION “WERFTALLEE”



The pilot area is a pedestrian & cycle path, located in north-west of Rostock between the districts „Groß Klein“ and „Warnemünde“.



DYNAMIC LIGHTING

PILOT LOCATION

- illumination of a pedestrian and cycle path
- citizen requests
- new installation



WERFTALLEE

- 800 m pedestrian and cycle path
- techn. LED luminaires
- dyn. lighting control (sensor technology)



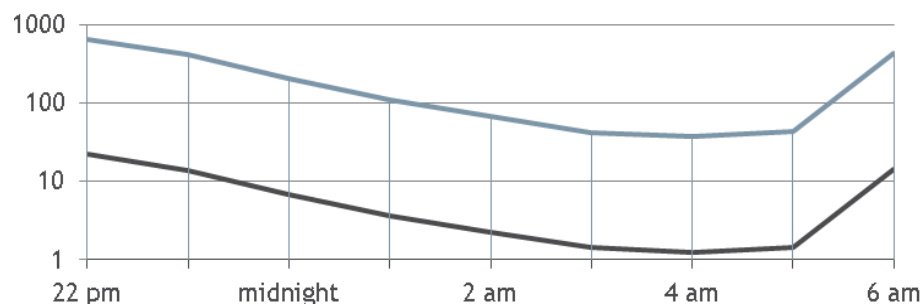
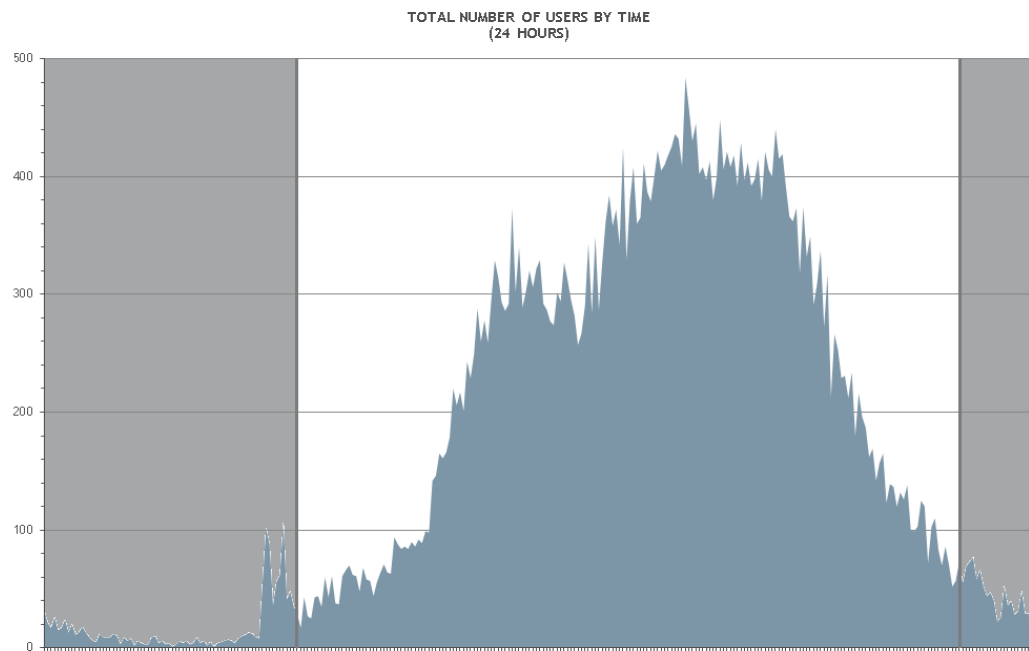
PILOT INSTALLATION

USER FREQUENCY

NUMBER OF USERS DEPENDING ON TIME OF DAY

- Determination of the frequency of use by camera-based traffic counting (30 days)
- Ø 900 users per day
- depending on weather & events

↓
high usage by day
low usage at night



TIME	USERS EACH NIGHT	USERS PER HOUR
24 hours	900	38
10 pm - 6 am	35	6
11 pm - 5 am	17	3
midnight - 4 am	9	2

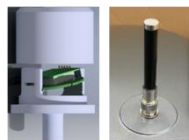


DYNAMIC LIGHTING

FUNCTIONALITY



Control Unit



Sensor (Infrared or Radar)



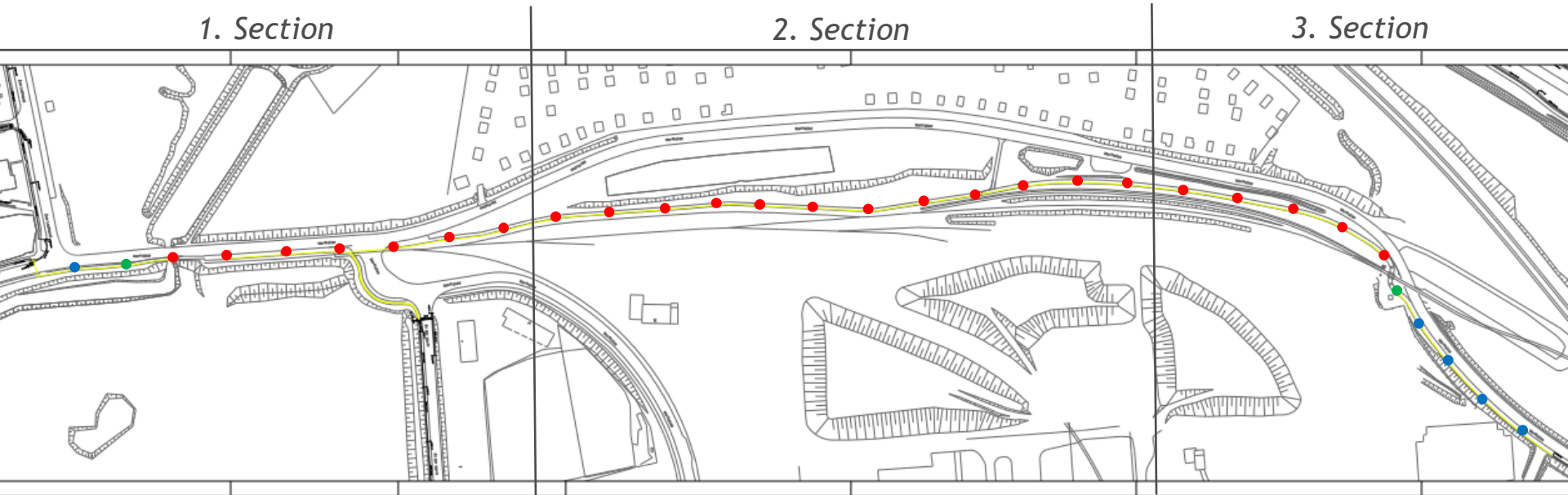
Communication

Gateway

Dongle



PILOT INSTALLATION IMPLEMENTATION



- 26x Alfons I, incl. IR-Sensor, 9 W
- 5x Alfons II, excl. IR-Sensor, 51 W
- 2x Alfons II, incl. IR Sensorbox, 51 W
- **REMOTE CONTROL VIA GATEWAY**

Technische Außenleuchte

Mastauf- / Mastansatzleuchte
ALFONS I FF LED



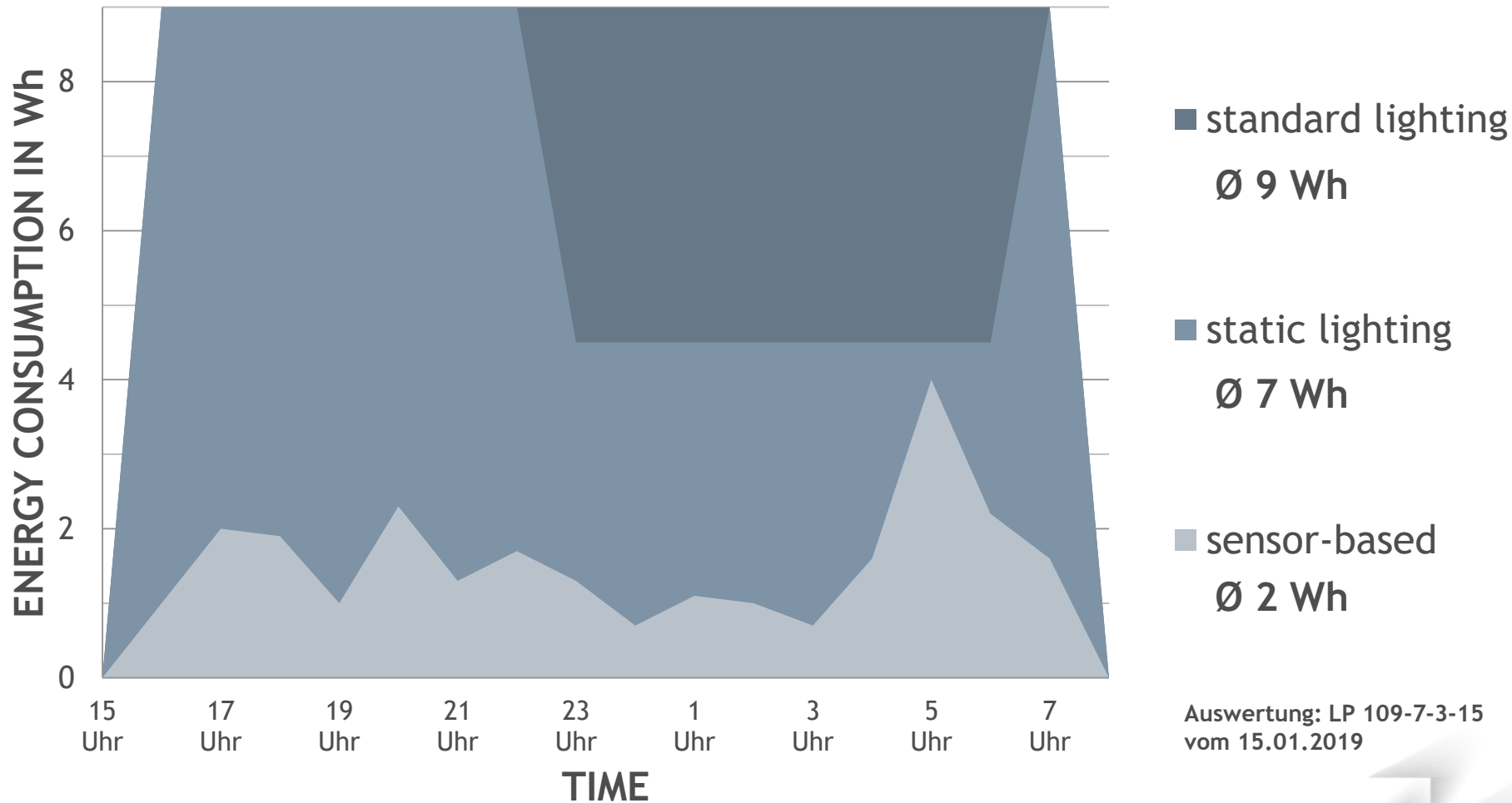
CE |  |  | EN 60598-2-3 | IP 66 | IK 10 | 220V – 240V / 50Hz – 60Hz

empf. Masthöhe: 3,00m – 6,00m
 Beleuchtungsaufgabe: niedriger und mittlerer Lichtbedarf
 Leuchtmittel: inkl. 1 oder 2 nicht austauschbare FF SW-X LED Module
 Farbtemperatur: 4 000K neutralweiß oder 3 000K warmweiß
 LED Betriebsgerät: elektronischer Treiber, bis 100.000 Stunden; Treiber mit Konstantlichtstromfunktion (CLD) über die gesamte Nutzungsdauer
 Lebensdauer der LED: bis 100.000 Stunden, 50.000 Stunden L100 für minimale Wartungskosten aufgrund exzellentem Wärmemanagements
 Lichtsteuerung: gegen Mehrpreis: Leistungsreduzierung, Dimmung bzw. CLEVER LIGHT
 optisches System: gerichtetes Licht (multi layer) durch austauschbare, allseitigbeständige Linsenoptik
 Lichtverteilung: sehr eng- und mittelstrahlende Radiengeometrie
 Leuchtenkopf: Aluminiumdruckguss, pulverbeschichtet
 Farbe: DB 703; andere Farben auf Anfrage
 Abdeckung: flaches, klares Einschleiben-Sicherheitsglas
 Anschluss: kompakt verdrahtet; mit Hilfe einer Steckkupplung im Inneren des Leuchtenkopfes; Leuchtenkopf zum Aufklappen
 Aufl.- bzw. Anbaumontage: ASA 60 oder ASA 76 separat zu bestellen.
 *ASA 60 für Ansatz ø 48mm bis 60mm (0° - 0° - 10°, -15°) bzw. für Ansatz ø 60mm (0° - 0° - 10°, -15°)



PILOT INSTALLATION

ENERGY CONSUMPTION



PILOT INSTALLATION

INVESTMENT

INVESTMENT COSTS

– planning costs	14.775,05 €
– lighting system (site facilities, installation works, light bodies, poles and foundations, cable network, protective cubes)	110.457,64 €
– sensors and control unit (infrared sensors, gateway for remote control and USB-Dongle)	14.118,16 €
– construction supervision	12.081,61 €
Total	151.432,46 €
ERDF-Funding	14.118,16 €



PILOT INSTALLATION

PROBLEMS & OBSTACLES

- merging different requirements (urban planning, technical standards, lighting design, social, economical & ecological needs)
- resulted in the lack of know-how we spend a lot of time to collect knowledge
- difficulties to find a reliable technical partner who offered a holistic solution that matched our idea of dynamic lighting
- delays caused by long bureaucratic processes (e.g. assignment procedure)



- well suited for pedestrian & cycle pathes
- high amount of investment costs
~ 10 %
- high energy saving potential
- nature protection



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LIGHTING STRATEGY

= demand-based, functional lighting concept that reduces energy and maintenance costs and is geared to the long-term conversion to efficient LED lighting

old: DISTRICT



new: SPACE

- simplification of luminaire diversity
- simplification of maintenance and servicing
- avoidance of light pollution
- reduction of energy consumption and CO₂-emissions
- improvement of light quality

OBJECTIVES



FUTURE PROSPECTS

LIGHTING STRATEGY

1. DEFINITION OF LIGHT CONCEPT
2. DETERMINATION LIGHTING TYPE
3. LUMINAIRE & MAST CRITERIA
4. LIGHT MANAGEMENT
= lighting control to adjust the light intensity
5. PLANNING & IMPLEMENTING
6. MONITORING




**Konzept für die Straßen-
und Wegebeleuchtung**
2019



FUTURE PROSPECTS

LIGHT MANAGEMENT

STANDARD LIGHTING

= constant illuminance

STATIC LIGHTING

= timely reduction of the illuminance (dimming)

COMBINATION
↑
↓

DYNAMIC LIGHTING

= sensor-based adjustment of the illuminance or the color temperature

Remote Control via Gateway

Local Control via Dongle



FUTURE PROSPECTS

LIGHT MANAGEMENT IN PUBLIC SPACES

PUBLIC LIGHTING IN ROSTOCK

NECESSITY OF ILLUMINATION

- supplement / gap-filling
- reconstruction
- insufficient lighting

ROAD DEPENDENT TRAFFIC NETWORK

- roads and paths
- public places
- conflict zones

ROAD INDEPENDENT TRAFFIC NETWORK

- park paths & green areas
- leisure areas & playgrounds

PLACES OF SPECIAL LIGHT SIGNIFICANCE

- historical places
- social areas
- port areas



planning example
for pedestrian and
cycle paths



**ACTION PLAN 100 %
CLIMATE PROTECTION**

↓ 95 % CO₂-emissions
↓ 50 % energy consumption

● ROSTOCK



Alles so schön grün hier.

THANK YOU!



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<https://www.facebook.com/CE.DynamicLight>



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Hanse- und Universitätsstadt
ROSTOCK

