

**INELS®**

## Smart Street Lighting

Economical and effective outdoor lighting solutions

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# ELKO EP



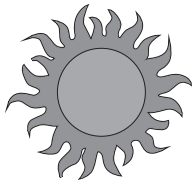
We are traditional, innovative and purely Czech development manufacturer of electronic devices and we have been your partner in the field of electroinstallations for 26 years.

ELKO EP employs about 330 people, exports its products to more than seventy countries, and has representatives in thirteen foreign branches. Company of the Year of the Zlín Region, Visionary of the Year, Global Exporter of the Year, Participation in the Czech TOP 100, these are just some of the awards received. Still, we are not finished. We are constantly striving to move forward in the field of innovation and development. That's our primary concern.

Millions of relays, thousands of satisfied customers, hundreds of our own employees, twenty six years of research, development and production, seventeen foreign branches, one company. ELKO EP, innovative- a purely Czech company based in Holešov, where development, production, logistics, service and support go hand in hand. We primarily focus on developing and manufacturing systems for building automation in the residential, commercial and industrial sector, a wide range of Smart city facilities and the so-called Internet of Things (IoT).



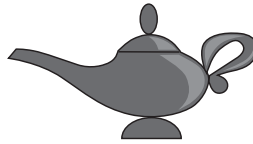
# Brief history of lighting



Here comes the sun



Getting hot in here



Where magic starts



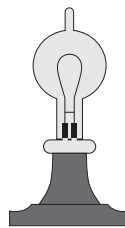
So do the fairytales



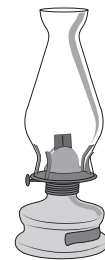
First light bulb hooray!



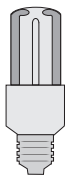
And first street lighting



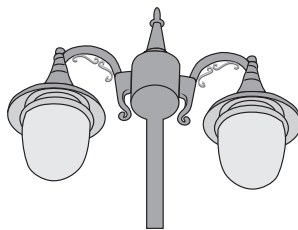
Like the electricity



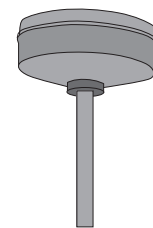
And many stories...



Then the first which supposedly saving energy



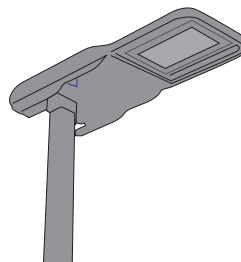
Visible everywhere worldwide



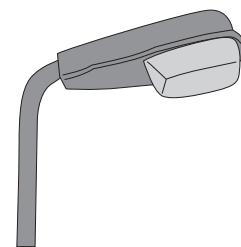
Old, but not so bad...



Finally, Smart lights are here!



First LED lights



Valve time!

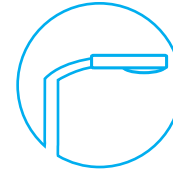
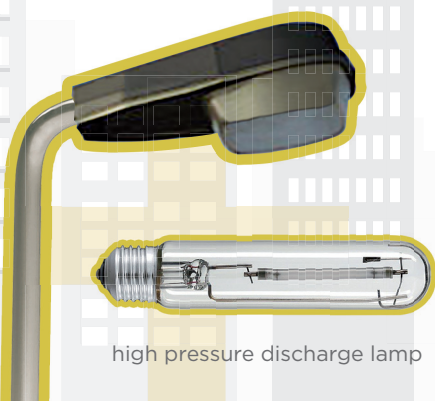
# Public lighting

Public lighting is an essential component of the services for residents in any city or village. It helps facilitate people's movement and orientation and contributes to greater security. But what if the lamps in the streets could work a little differently? What if they could be much smarter? Smart lighting by our design are not just meant to shine. He can think through the light. It can regu-

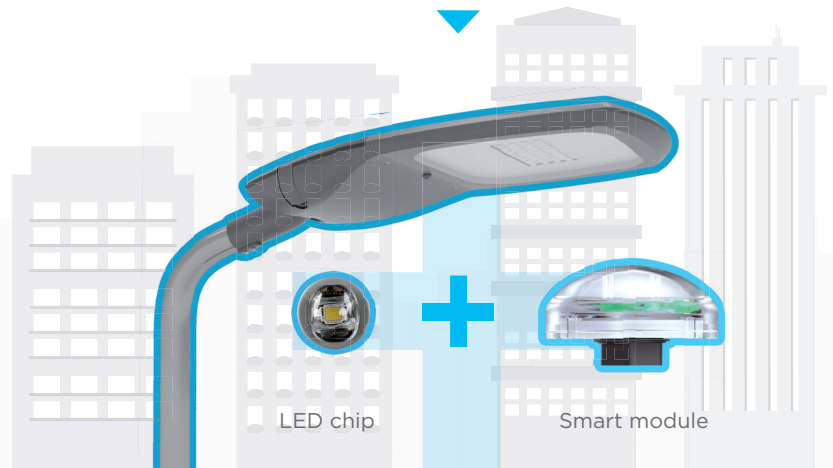
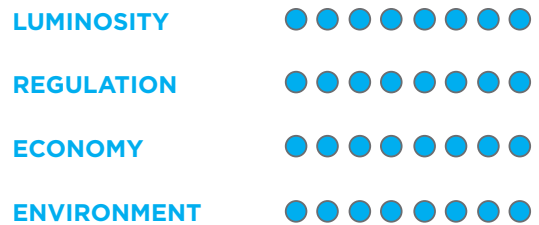
late the intensity of light based on the time of day, the ambient light and traffic density. In the event of a fault, it can transmit information required for repairs. Masts can serve as a conduit for additional sensors, detectors, weather stations, Wi-Fi signal transmitters, or security keys.



## STANDARD STREET LIGHTING



## SMART STREET LIGHTING



# Saving analysis

Lighting source	250W high pressure sodium	110W LED street lights
Number of sources	10 000	
Lighting time in a day	12	
Lighting days in a year	365	
Daily Power consumption	36 700 kWh	14 100 kWh
Annual Power Consumption	13 402 800 kWh	5 160 100 kWh
Daily Electricity Fee	4 840 Eur	1 860 Eur
Annual Electricity Fee	1 760 850 Eur	681 020 Eur

110W LED Street Light with Smart Street Lighting Control System	
Energy Saving Mode	Dimmable Energy Saving
Strategy	Dimming The Light According to the 12 hrs of Lighting
Energy Saving Mode	30%
Total Energy Saving Rate	73,04%
Annual charge after reconstruction	476,890 Eur

## What are the benefits of smart lighting?



### High flexibility

Smart lighting is able to promptly communicate with the control unit, to react and adapt to the light intensity.



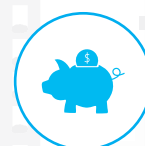
### Environment

By reducing the energy consumed by lighting we are able to greatly reduce the impact on nature and the environment.



### Easy installation

Upgrading your existing lighting to smart is not at all that challenging. According to the scope of change it is just a matter of a few days.



### Economical

Thanks to the use of modern LED lights, it is possible to save a lot of the operating costs each year for the operation of each smart lamp.

# Retrofit options

How can we deal with the renewal of public lighting? Let's describe the basic options and how much it will cost us. It is necessary to say that in the case of re-

newal of public lighting it is an investment for several decades. As in normal cases, the cheapest solution at the beginning is not usually so in the long-term.

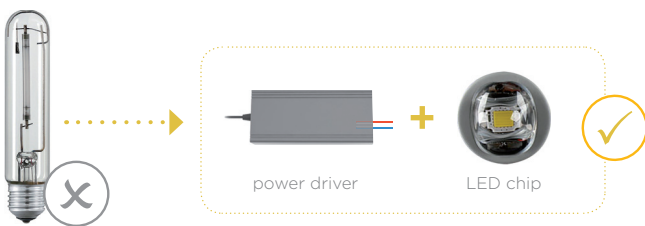
## 1 „Corn“



- Replacement of old light sources (high pressure sodium) after LED lights called „Corn“.
- Price of revitalization of one light point: **50 EUR\***.

This solution is very simple and inexpensive but has one major drawback. Troublesome cooling reduces significantly the life and luminous efficacy of the LED light.

## 2 LED light source retrofit



- Replacement of a part of the luminaire with new ones (e.g. high pressure sodium lamps).
- The revitalization price of one light spot: **150 EUR\***.

Again a relatively easy solution. The question remains, however, whether there is a suitable and especially high-quality retrofit for you. Here, too, we encounter troublesome cooling problems.

## 3 Replacement lighting fixture



- Replace old lights fixtures with new ones.
- The price of revitalization of one light spot: - high quality LED - **200 EUR\***.

Complete replacement of the luminaires brings higher costs, but it will certainly pay off, ideally combining the replacement of luminaires with the installation of smart drivers.

## 4 Smart Street Lamp



- Complete replacement of public lighting including masts, wiring and lights.
- Price of revitalization of one light spot: **250 EUR\***.

We recommend this option for installations older than 30 years. With new luminaires it is always wise to add smart control. We supply our modules directly in the luminaires or as an external device.

\* The prices above not include: installation, column and accessories.

# SSL controllers

For smart lighting to function correctly, the light fitting must be equipped with a communication module. Modules differ in design, installation, and communication network, but their function is always the same. For communication, wireless LPWAN networks, especially **LoRa** and **NB-IoT**, should be used (see page 10 for

**more details**). They allow **two-way** communication - they can not only control but also receive information from the light fittings. This is conditional on the availability of a given network with sufficient signal at the point where the light fittings are located. Signal quality can be determined by a special signal strength indicator.

## Retrofit modul

## Retrofit



Outdoor design for retrofits, placement externally on the body of the light, mast or base.

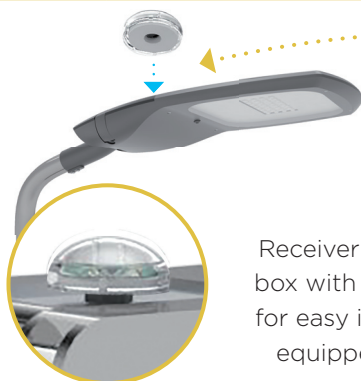


AirSLC-100L  
AirSLC-100Nb

- **Outputs:**  
0(1) - 10V DC / 10 mA
- **Connection:** wire outlets
- **Power supply:** 110 - 230 V AC
- **Dimensions:**  
- 182 x 62 x 34 with antenna  
- 96 x 62 x 34 without antenna
- **Communication:** LoRa/NB-IoT
- **Antenna:** included

## PLUG-IN (socket)

## Plug



Receiver actuator in a special box with a bayonet connector for easy installation into lights equipped with this socket.

AirSLC-100/LWES



Power supply: 12-24 V DC  
Output: 0 (1)-10 V (20 mA) DALI  
Communication: LoRa/NB-IoT  
Dimensions: ø 80 x 34 mm

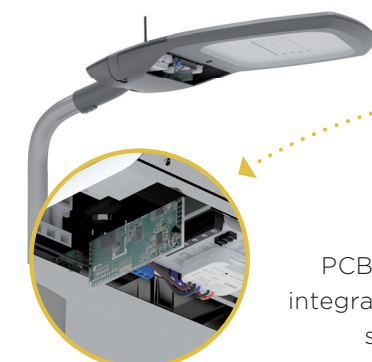
AirSLC-100/NEMA



Power supply: AC 100-230 V AC  
Output: 0 (1)-10 V DALI  
Communication: LoRa/NB-IoT  
Dimensions: 84 x 98 mm

## OEM (built-in) - Embedded

## Embedded



PCB board for direct integration into the power supply board.



LoRaWAN Modul OEM (OEM)

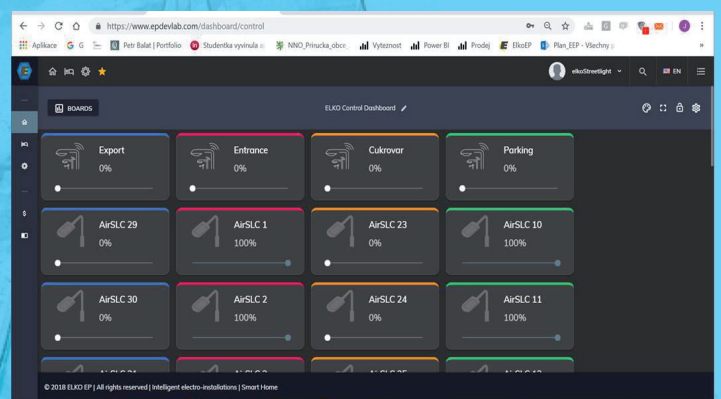
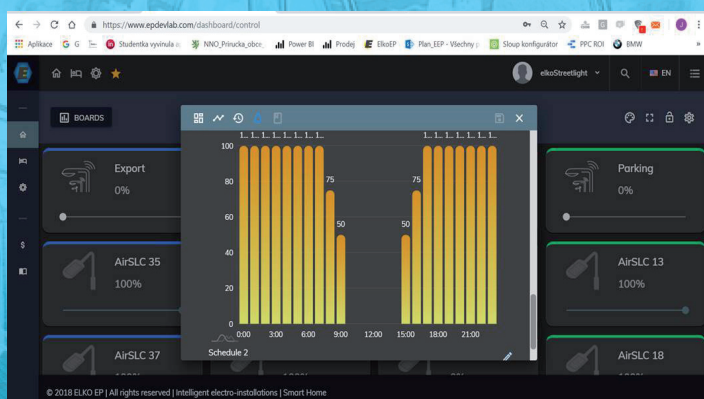
- **Connection:** soldering pins
- **Power supply:** 5-24VDC, after breaking source parts only stabilized 3V3 / 140mAh
- **Dimensions:**  
- 19.5 x 46.1 (33.8)\* x 4 mm with ULF connector  
- 119.5 x 57 (44.7)\* x 7 mm with SMA connector  
- 19.5 x 46.1 (33.8)\* x 21 mm with internal antenna
- \* dimension after breaking the source section
- **Gain:** + 2,12 dB
- **Communication:** LoRa 868Mhz
- **Antenna:** external ULF or SMA connector, internal bent parts of the product

# Smart street lighting platform (SSLP)

All smart street lights are connected to Smart city platform wirelessly. It gives you an easy way how to control and monitor all the lights in the city.



- **USER FRIENDLY PLATFORM**  
on your computer or laptop
- **EFFECTIVE REPORTING TOOLS**  
graphs, data and saving analysis
- **PREDEFINED SETTINGS**  
for easy and smart lighting and energy savings
- **ADVANCED DIMMING**  
scheduled dimming
- **GPS DETECTION**  
faster way how to find a defect on the lights
- **SECURITY**  
with proper and safe authorization
- **COST REDUCTIONS**  
with new working management
- **READY FOR IoT**  
it is connectively ready
- **WIRELESS SOLUTION**  
easy to upgrade whenever you want

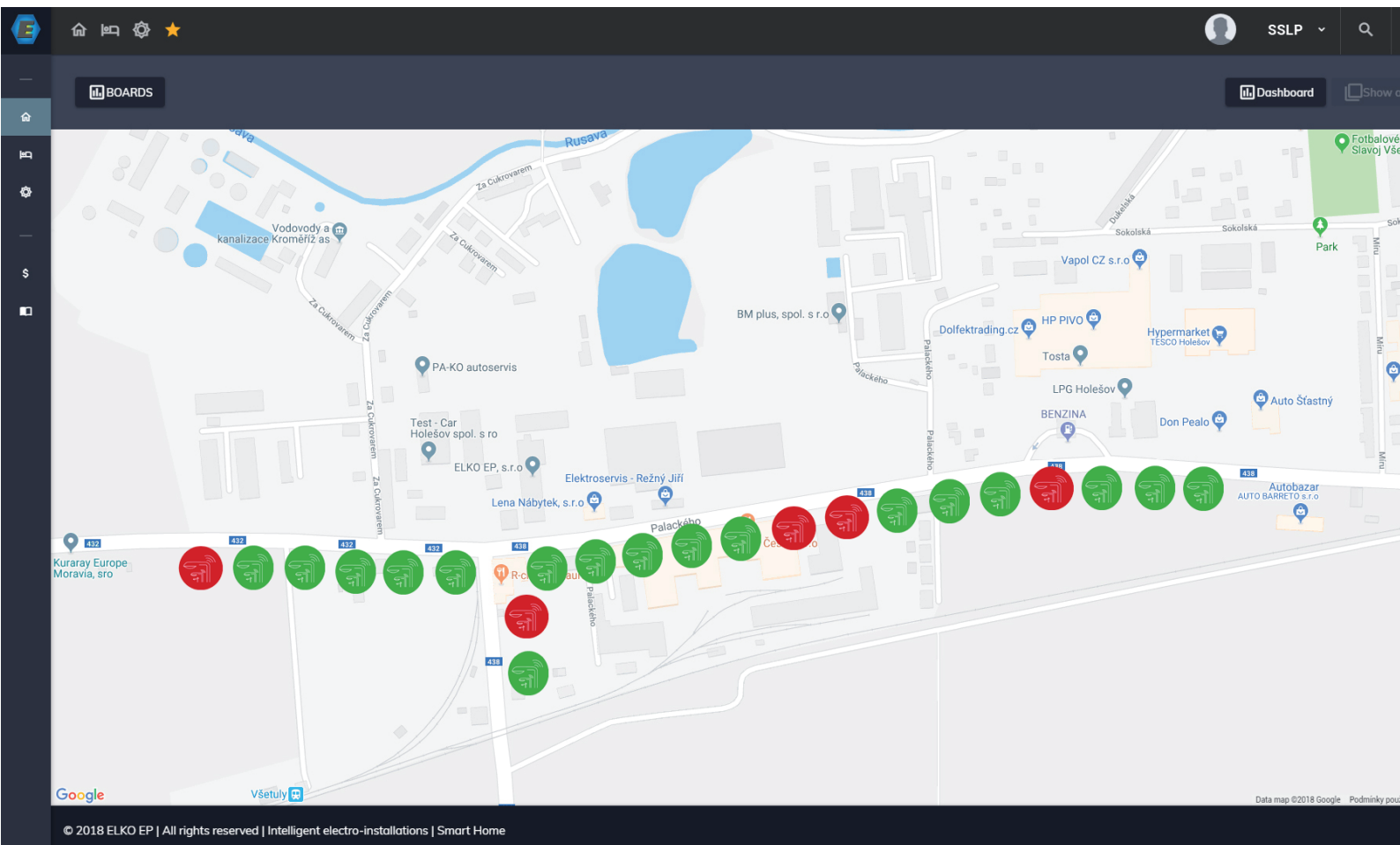






We believe that each Smart city should have only one control platform. It allows not only the collection and evaluation of data, but also the control of

all the elements of the smart city. That's why with our smart lighting, you'll also get a light control module.



### System cooperation:

- changes in intensity occurrences
- plan switching events occurrences
- adding / changing / removing the lamp occurrences
- emergency situations
- 3<sup>rd</sup> parties commands

### Reporting:





- consumption reporting
- operation reporting
- disorder reporting
- service state reporting

### Function:

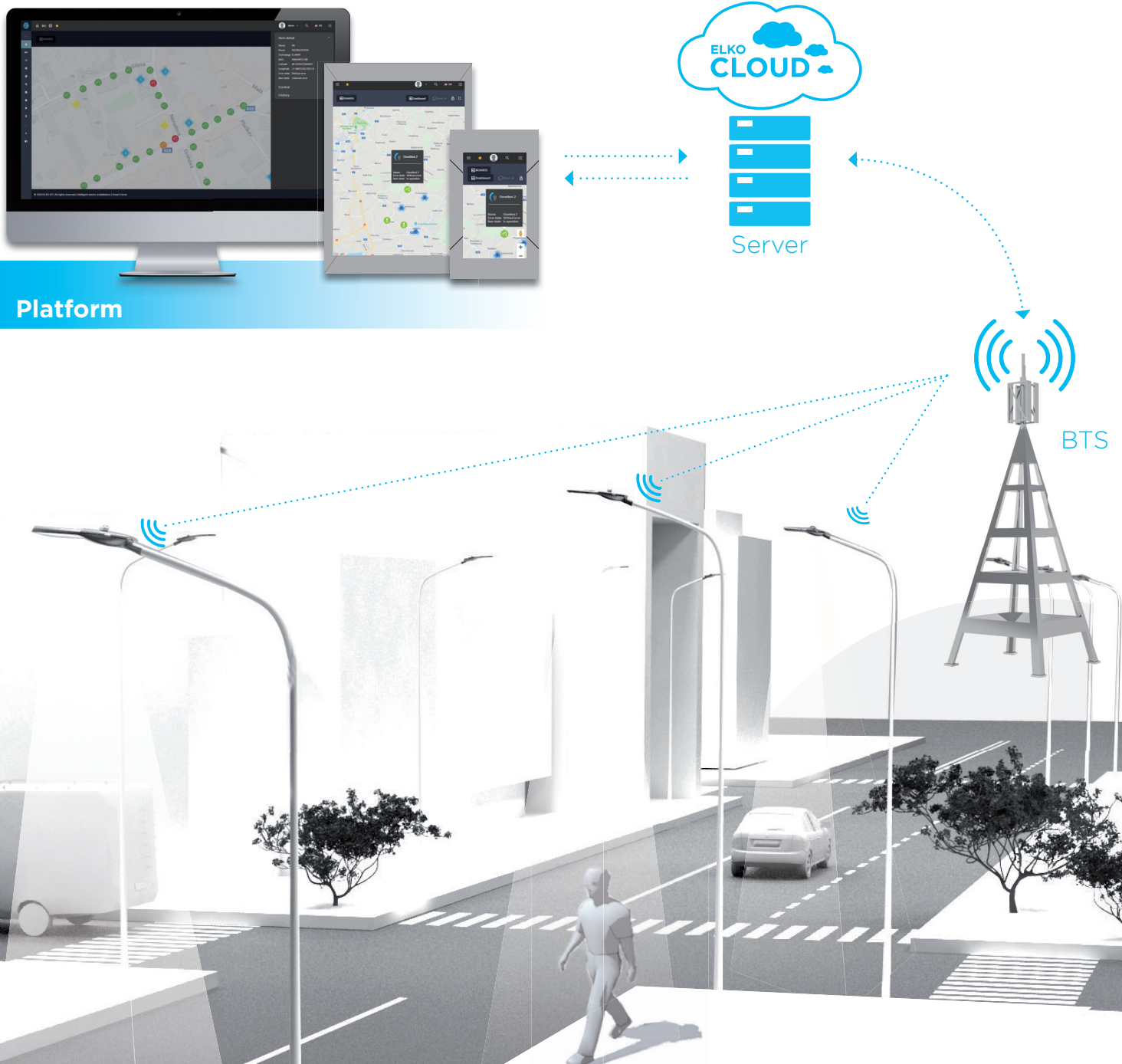
- displayed on the map according to the light
- monitoring according to operating status
- individual and group control
- graphs and statistics according to lighting, consumption, lifetime



# Network comparison

Items	LoRa	NB-IoT	GPRS	ZIGBEE
				
<b>Frequency band</b>	470/868/915 MHz	800/900/1800 MHz	850/900/1800 MHz	470M/868M/915M/2.4 G Hz
<b>Communication distance</b>	10-15 km ideally 1-5 km urban rare	15 km	Unlimited	Node to Node: 150M
<b>Communication speed</b>	0,2 37,5 Kbps	65 Kbps	115K bps	250 Kbps
<b>Advantage</b>	Good security Good anti-interference, low power consumption, low maintenance Wlan, multi-connections, free frequency	good security, good anti-interference, low power consumption, low maintenance, Wlan	Good security, good anti-interference, short time of accessing, low power consumption, low maintenance, high speed of comm	Auto-mesh, high common speed
<b>Disadvantage</b>	Low speed of communication, max connection 500-1000 node, long distance	High price, NB-IoT network, public frequency	Data loss	Interferred by other radio, max. connections only 255 nodes, comm distance short

# Principle of function



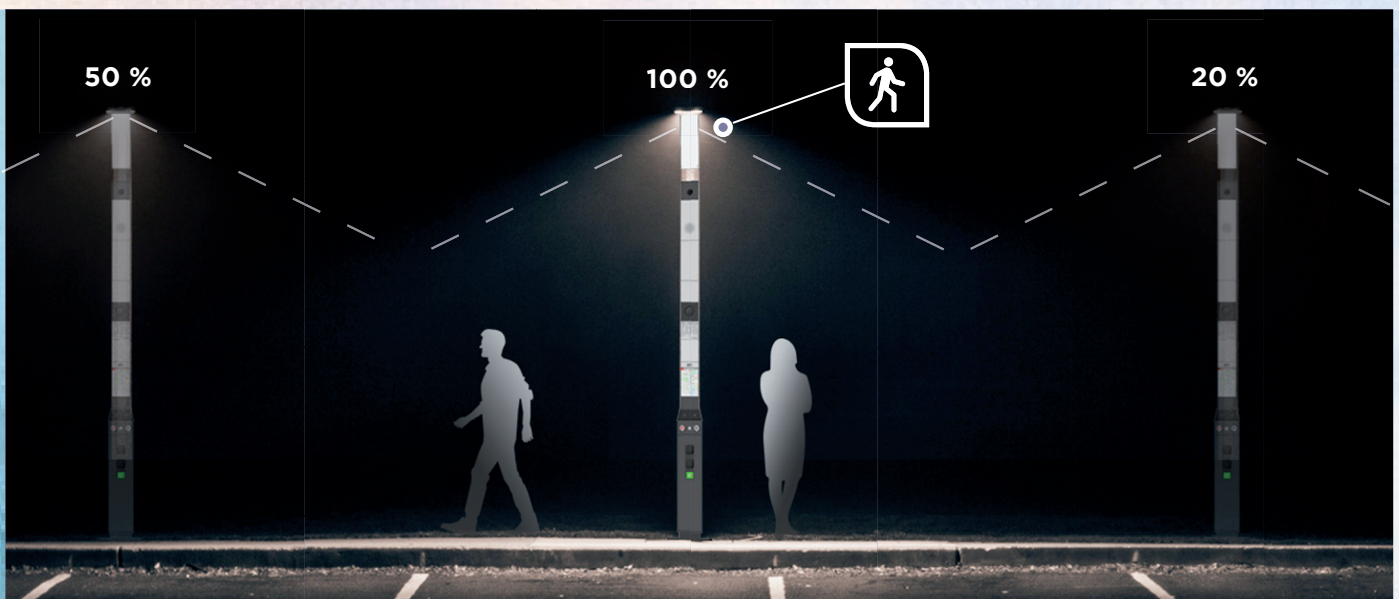
The main component of the infrastructure is the LoRA/NB-IoT LPWAN network that provides connectivity for IoT devices in Smart City. BTS (Base Transceiver Station) receives commands from the backend server and sends them wirelessly to the individual light actuators. They process and execute the command (ON/OFF or the desired brightness setting).

The actuators are also equipped with sensors that detect the ambient parameters or input activation and send this information via the BTS back to the server, which evaluates, displays and can trigger the appropriate action.

# Smart pole

In every big city we can find thousands today, sometimes even tens of thousands of public lighting poles. We can use this dense network to install sensors or security cameras, and thus increase security for the population. We gain information about the number of people or vehicles, we can evaluate the air qual-

ity or the noise level, inform the inhabitants about the status of transport and parking places. Poles can also be used for Wi-Fi signals or recharging stations. So we have absolutely unlimited possibilities to work with smart lighting, and it's up to the investor to improve the quality of life in the city.

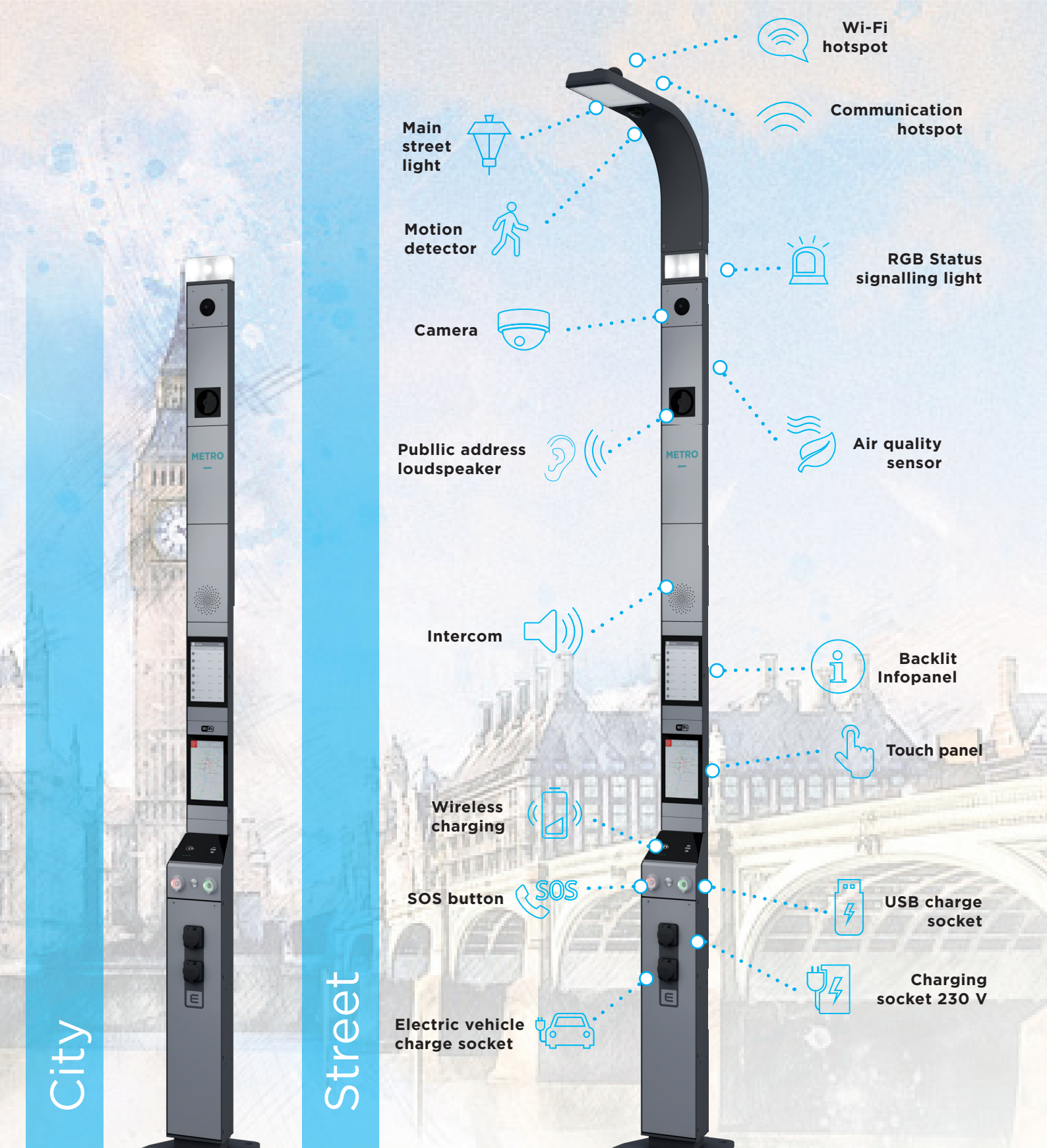


Charger



Kiosk





# Pole setup



## Wi-Fi Hotspot

Connecting to the Internet becomes a public and an easily accessible property. Any Wi-Fi signal from our transmitter will flow through every smart pole.



## Public Address Loudspeaker

Warnings, reports. With this built-in speaker you will never miss any important information.



## Wireless charger

Let you charge your mobile phone while you are waiting for a bus. The wireless charger will take care of everything.



## SOS button

Are you in real trouble and need help? One push of this button will tell the rescue services that something is wrong.



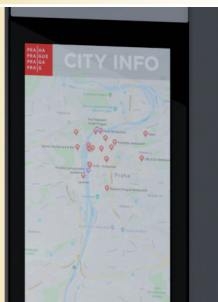
## RGB Status Signalling Light

The smart pole determines when it needs to be repaired. One of three colors indicates the status of the device.



## Camera

The basis of security in each city is a system of security cameras that monitor the streets.



## Touch panel

Touch panel to find the information you need. It includes, for example, a clear map of the city.



## USB charge socket

There is also a universal USB charger to connect to any device or appliance.



## Motion detector

The sensor built into the body of the pole serves to detect the movement of people around you. This switches on the light only if it is really needed.



## Electric vehicle charge socket

The time of electric cars is knocking on the door. Charging ahead of the long journey has never been easier than with our iNELS pole.





### Air quality sensor

Smart sensors are the basic means for collecting and evaluating information. This will greatly contribute to improving air quality in cities.



### Communication hotspot

This device receives signals from sensors that control public lighting. Increases efficiency and cost savings.



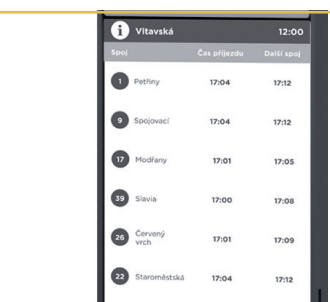
### Charging socket 230V

The classic socket, as we know it, for moments when you just need a good dose of electricity.



### Socket 22 kW

The 22kW charging station is also suitable for outdoor environments. It charges up to 10 times faster.

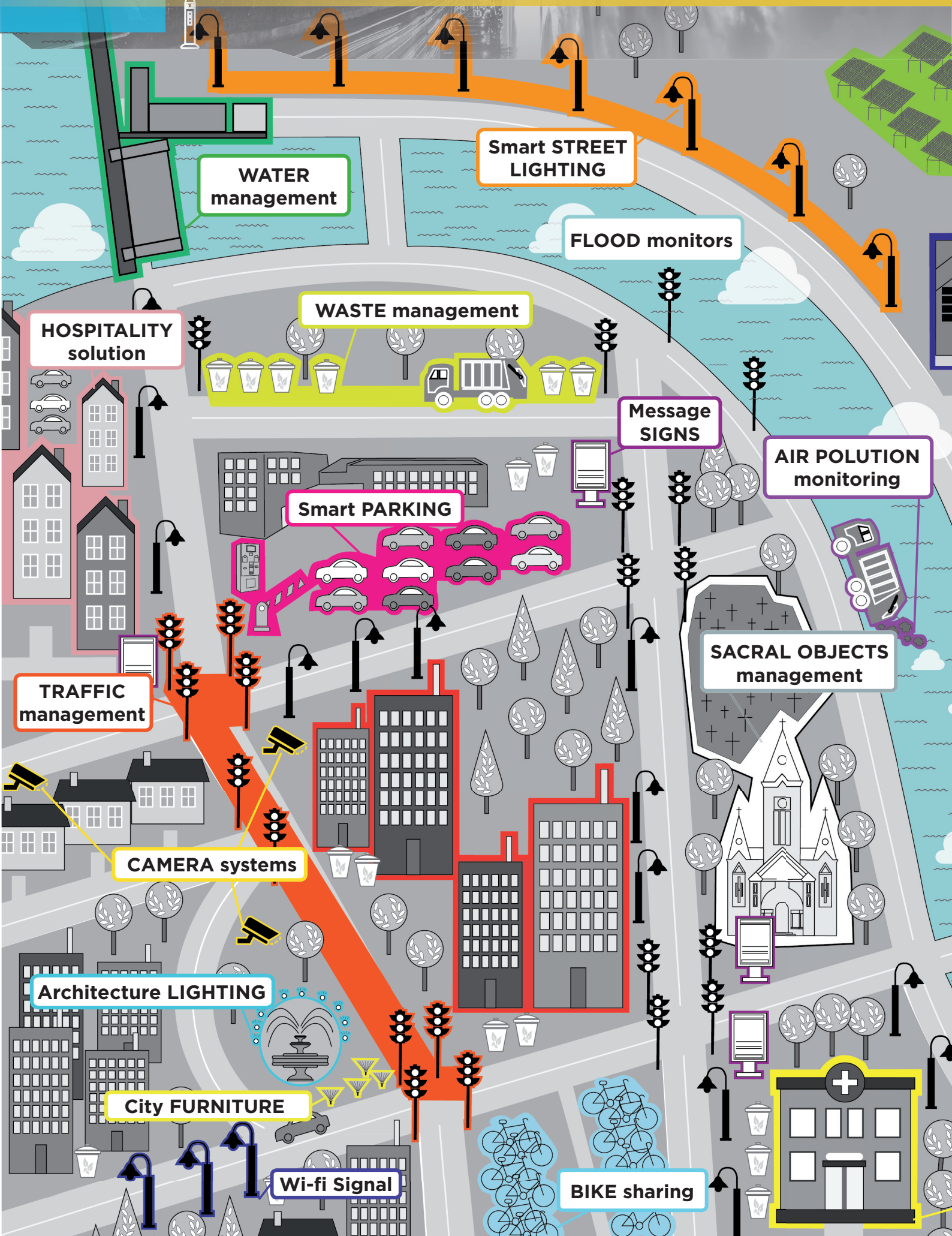


### Backlit infopanel

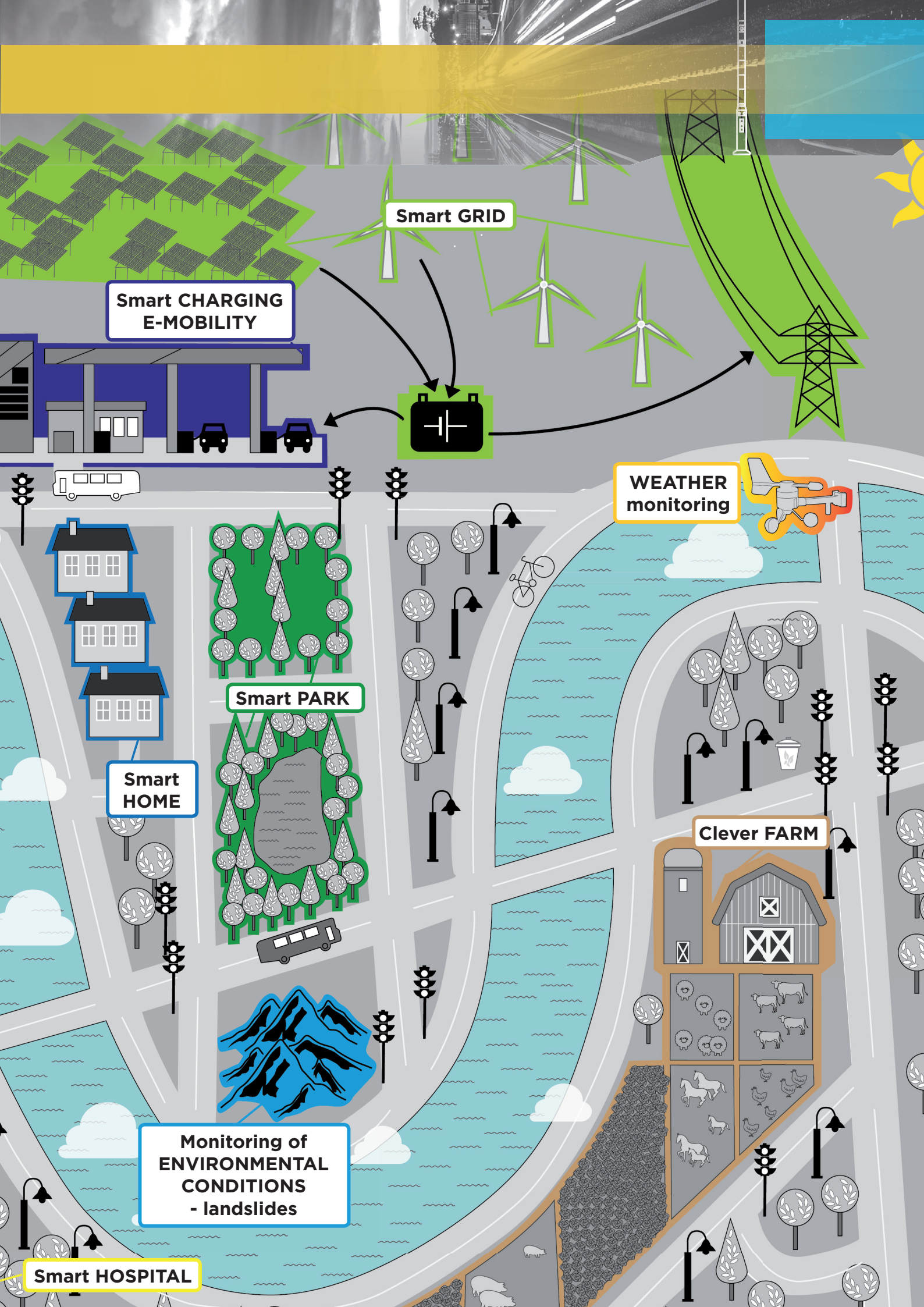
Do you want to get rid of unnecessary street signs? That's why we have a panel where you can place the name of the street on which the lamp is located.



# Smart city







Smart GRID

Smart CHARGING E-MOBILITY

WEATHER monitoring

Smart PARK

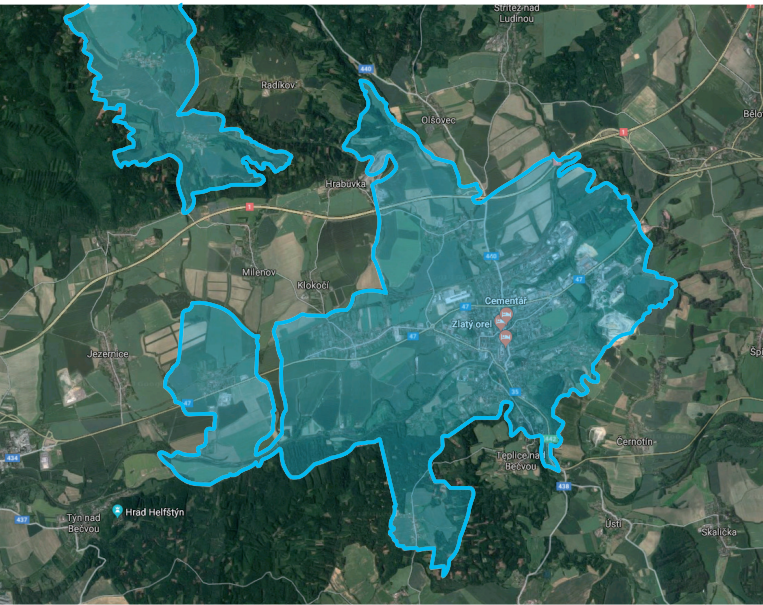
Smart HOME

Clever FARM

Monitoring of ENVIRONMENTAL CONDITIONS - landslides

Smart HOSPITAL

# Hranice town



**Location:** Hranice, Czech Republic

**Investor:** Ekoltes Hranice, a.s., city company

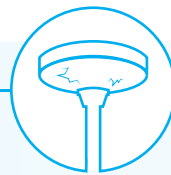
**Suppliers:**

Elektro-Lumen s.r.o. Hranice - lights, poles

ELKO EP, s.r.o. - control technology

**Solution:**

BTS broadcasting stations, monitoring and controlling products, IoT platform



## BEFORE

14 892  
kWh

power consumption

2000 K

chromacity temperature

170 W

output

X

brightness control

The original public lighting in this area was equipped with discharge lamps with sodium sources. This solution had a number of negative aspects, including inter alia higher electricity consumption. Not only that the sodium lamps themselves are consuming a lot of energy, the lights were also lit all night. This is often unnecessary, especially in the morning. Lighting controls were implemented using a twilight switch. The lighting circuit was switched on via the power control in the switchboard. But it was not able to respond adequately.



# Case study



## AFTER



4 327  
kWh

power consumption

4 000 K

chromacity temperature

59 W

output

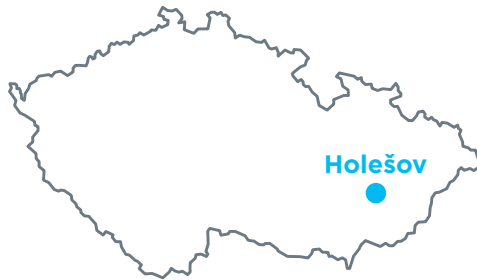
0-100%

brightness control



The new lights saves electricity by using more energy-efficient LED light sources and it is also set to reduce the lighting intensity by use of the time program. This can be changed at any time by the software that can also be set and configured. Of course the lamps are divided into groups, but you can control each lamp individually. The system is therefore highly variable, and it will recover the cost. All communication is secured by the local independent BTS station. It is conveniently positioned to ensure seamless communication with intelligent components installed directly on the smart light columns.

# Smart street lighting



**Location:** Holešov, Czech Republic

**Place of the installation:** ELKO EP Holding



Modern street lighting („Smart Street Light“) can work almost independently and I also think practically. In the event of a fault, it can inform itself about the repair, even incorporating a fault prediction if the light source is losing power or aging. It can respond not only to the daylight level but also to the density of the

current traffic on the road or the area and accordingly adjust the intensity of the light. This reduces costs and increases security. Light sources in such lights are mainly LEDs capable of saving up to 60 percent of energy. Moreover, frequent switching or dimming does not matter.



# Industrial zone

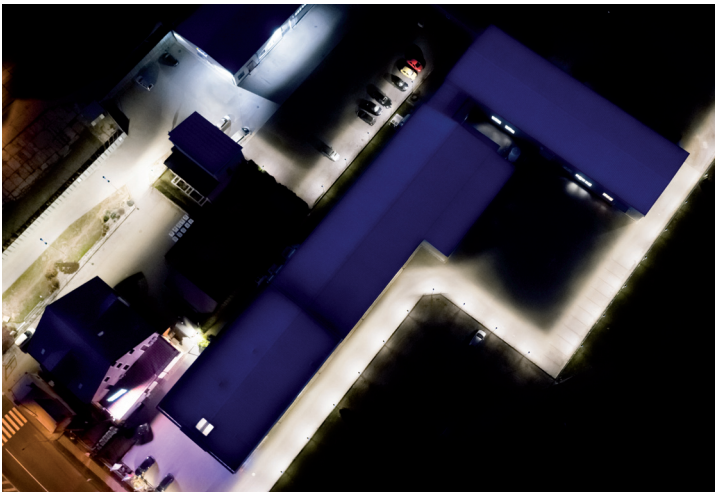
Lights on 25%



Lights on 75%



Lights on 100%



# Smart pole

POLOŽKY / INFO    TYP **STREET**    Vyskládat default    KOMPONENTY    A

## Hlavní světlo

INFO    Sed ut perspiciatis unde omnis iste natus error sit voluptatem accusantium doloremque laudantium, totam rem aperiam, eaque ipsa quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt explicabo.

KOMPATIBILNÍ    KIOSK  
CITY  
STREET

16  
Hlavní světlo

DETAIL

CHYTRÝ SLOUP

ZVOLTE VARIANTU

CHARGER    KIOSK    CITY    STREET

KONFIGURÁTOR  
O SLOUPU  
KONTAKTY

CHYTRÝ SLOUP

CHARGER    KIOSK

KONFIGURÁTOR  
O SLOUPU  
KONTAKTY

# Configurator

POLOŽKY / INFO	STREET	KOMPONENTY
<b>VAŠE KONFIGURACE</b> Výška 280 cm Hmotnost 170 kg Celková cena <b>189 500 Kč</b>		
Ke stažení <a href="#">Konfigurace v PDF</a> <a href="#">Uložit obrázky</a> <a href="#">Položkový rozpočet</a> <a href="#">Odeslat mailem</a>		DETAIL
<b>POUŽITÉ MODULY</b>		
19 Hlavní světlo		DETAIL
18 Poziční světlo RGB		
17 Kamera		DETAIL
16 Enviromentální modul ovzduší		
15 Tlakový reproduktor IZS		DETAIL
14 Info panel		
13 Reproduktor		
12 Podsvícený info panel		
10 Dotykový panel		
9 Platební systém		
8 Qi (bezdrátová) nabíječka		

ZVOLTE VARIANTU

**CITY** **STREET**

KONFIGUROVAT →

**CHYTRÝ SLOUP**

KONFIGURÁTOR  
O SLOUPU  
KONTAKTY

**ELLO ep**

**CHARGER** **KIOSK** **CITY** **STREET**

ZVOLTE VARIANTU

Each city is different, so is the pole, that will serve its inhabitants. That's why we've created this configurator to let you choose exactly what you need the pole to have. Whether the pole will be used for car charging only or will be lighting the city roads, you can be sure that it will be a great addition in your city.

# ELKO EP Holding



[www.elkoep.com](http://www.elkoep.com)

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