SEAK

Smart lighting control
in the cities and buildings

Smart EV charging
in public lighting columns

TÜV SÜD ISO 9001

TÜV SÜD ISO 14001

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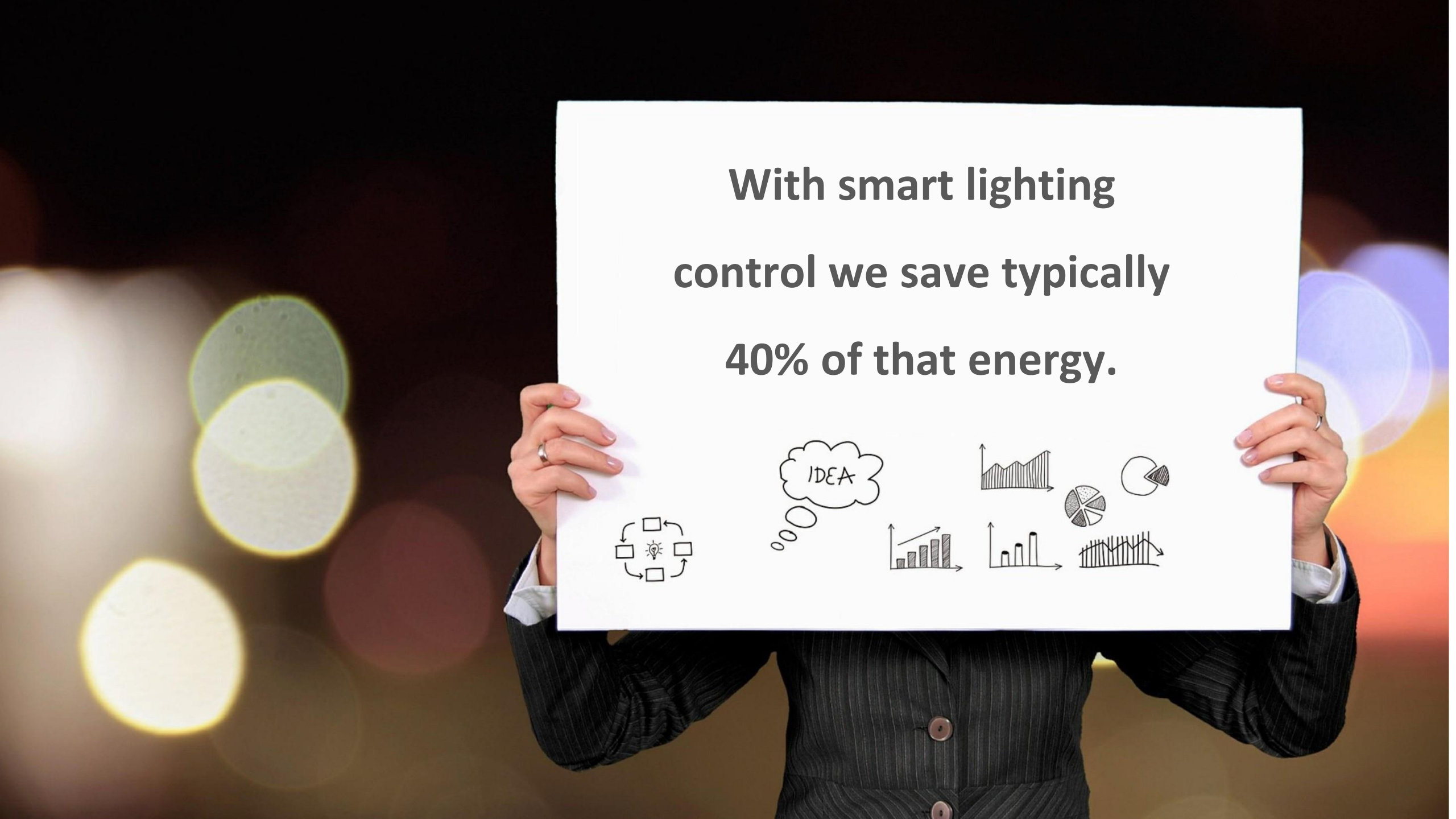
BRITISH EMBASSY GREEN TECH AWARDS 2021

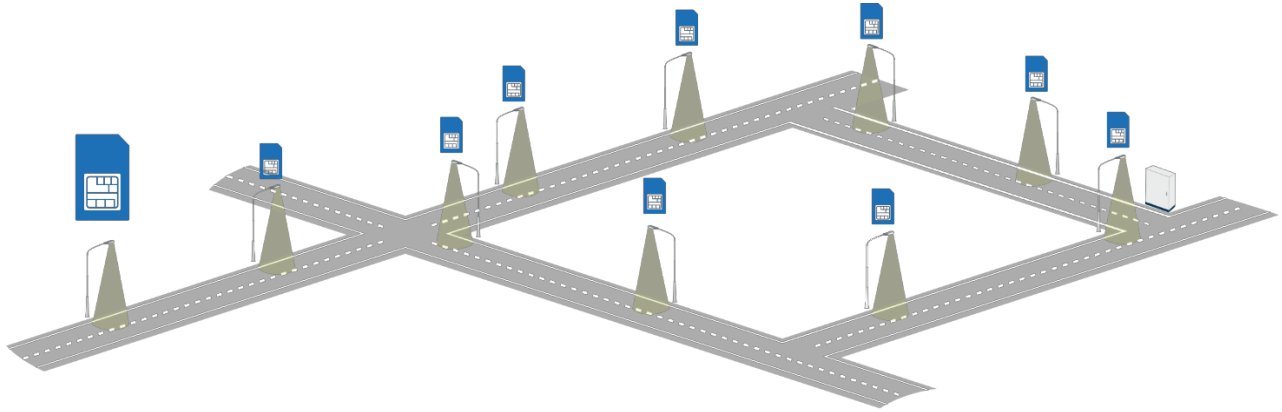
19% of global energy consumption is for public lighting

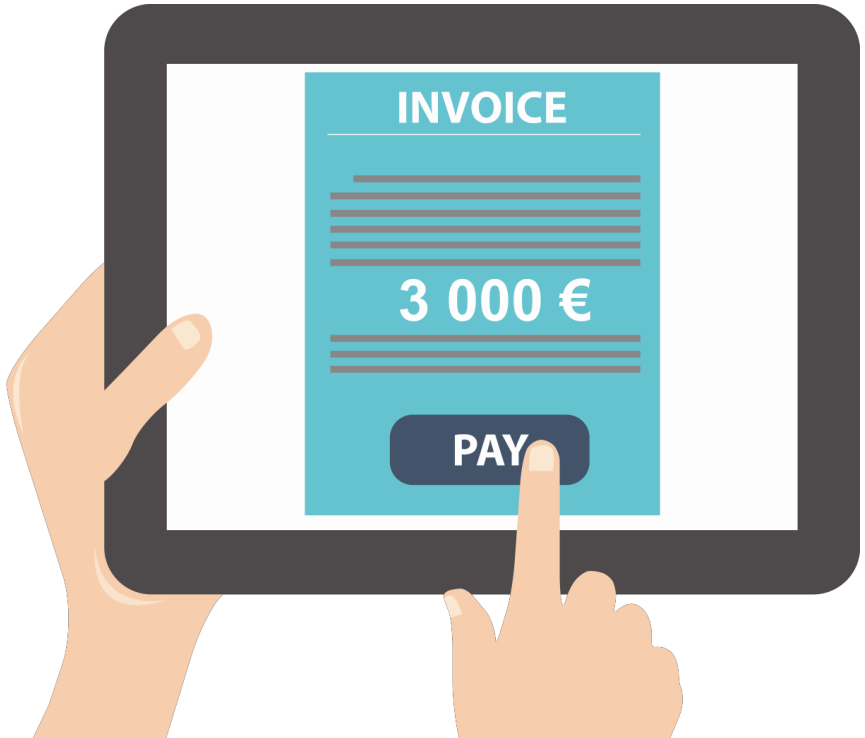

With smart lighting
control we save typically
40% of that energy.
IDEA

Smart Lighting Control is nothing new

There are more solutions for lighting control

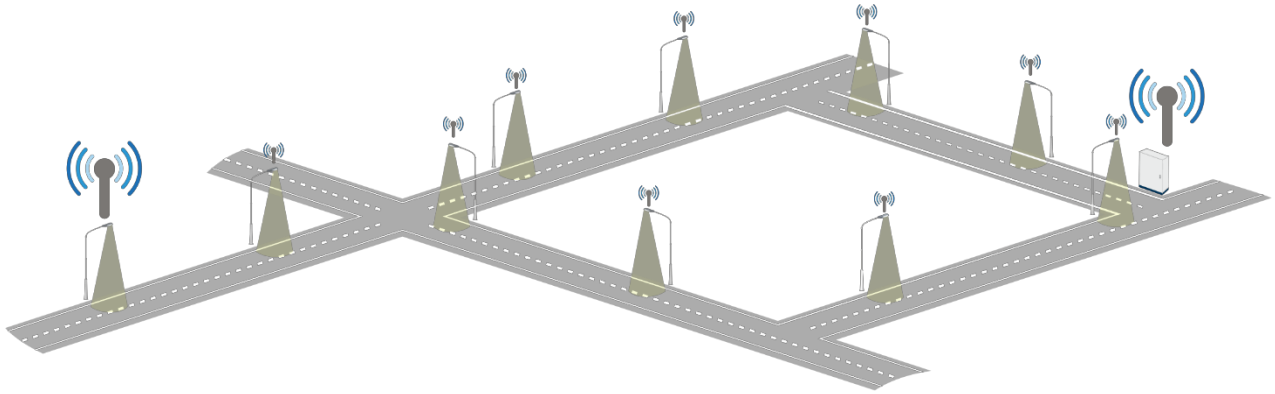
1 Based on GSM modul (SIM card) in each luminaire

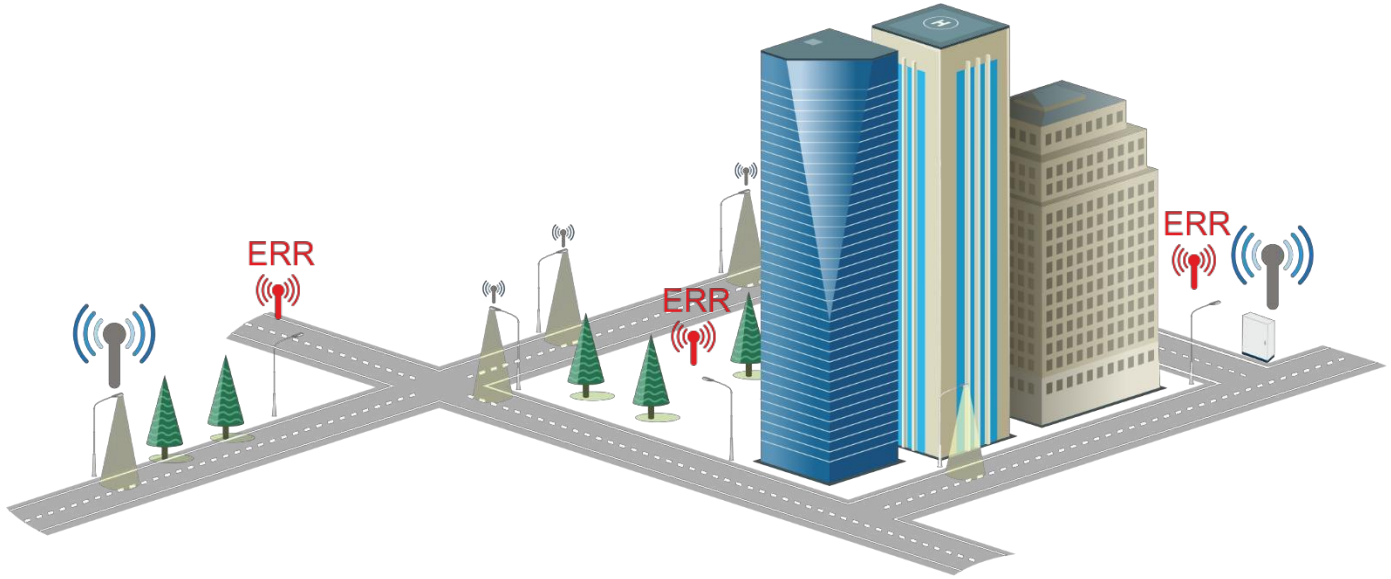




Expensive equipment + Monthly costs

2 Radio mesh networks





Not stable

New building or tree…

3 SEAK powerline lighting control

We use existing 230V wires

to transmit control signals.

No new cables

No antennas needed

SEAK Powerline Communication

The principle

Unique, original, low frequency powerline communication designed especially for lighting control.

Each modulation is then encoded as a 1 or 0, allowing transmissions at 50 b/s or more.

Multiple material benefits compared to classic DALI technologies

	SEAK Powerline	DALI solution
Luminaire requirements	DALI, 1-10V or PWM	DALI interface required
Installation	No control cable needed	Additional control cable needed for each luminaire
When changing layout (tenant request)	Only configuration change	Control cables need to be refitted
Versatility	Powerline up to 5000 m	Control cable max. 300 m
Communication type	Half-duplex, asynch	
Communication speed	50 bps	1200 bps
Supported lamp types	LED, HID	

Research, Development & Production in Presov

High-quality technology

Award-winning technology

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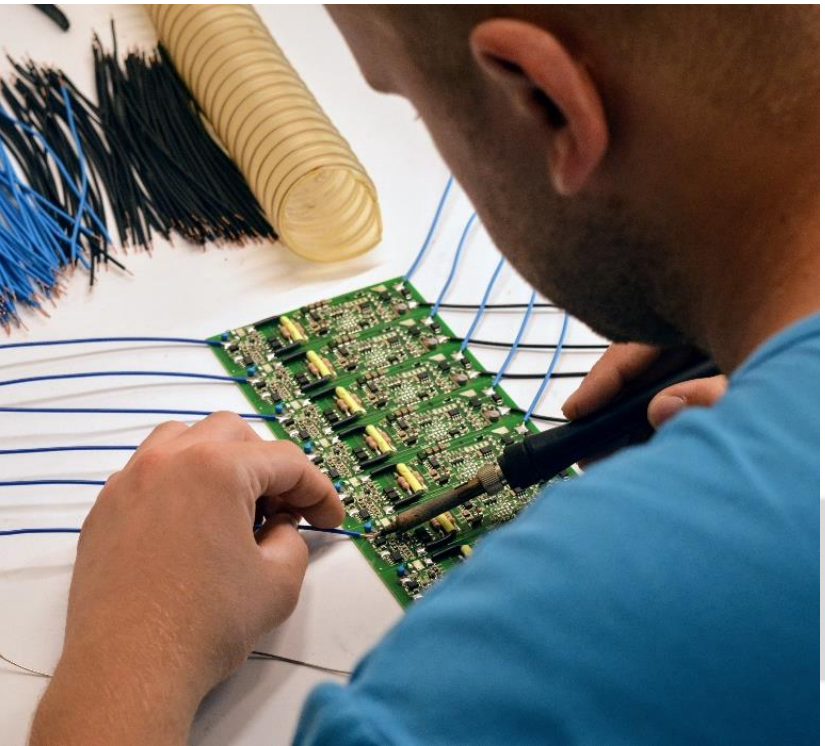
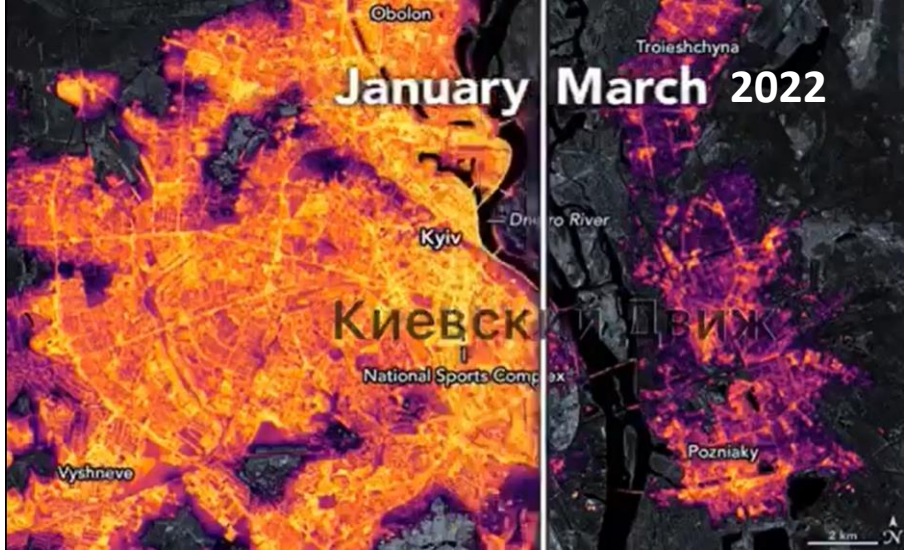
INOVATÍVNY ČIN ROKA



Kyiv
Ukraine

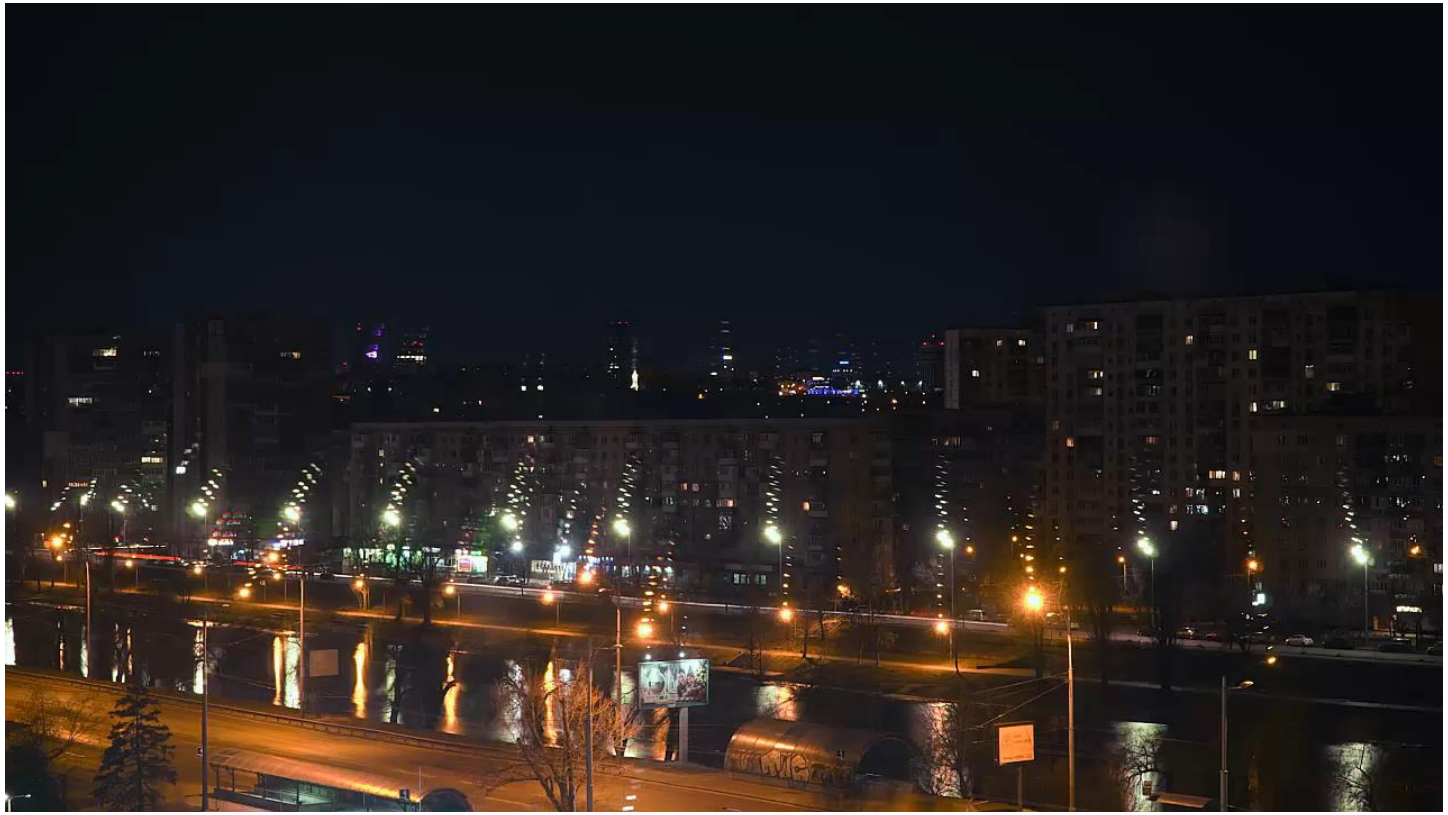
Our technology helps save lives



55 000
luminaires

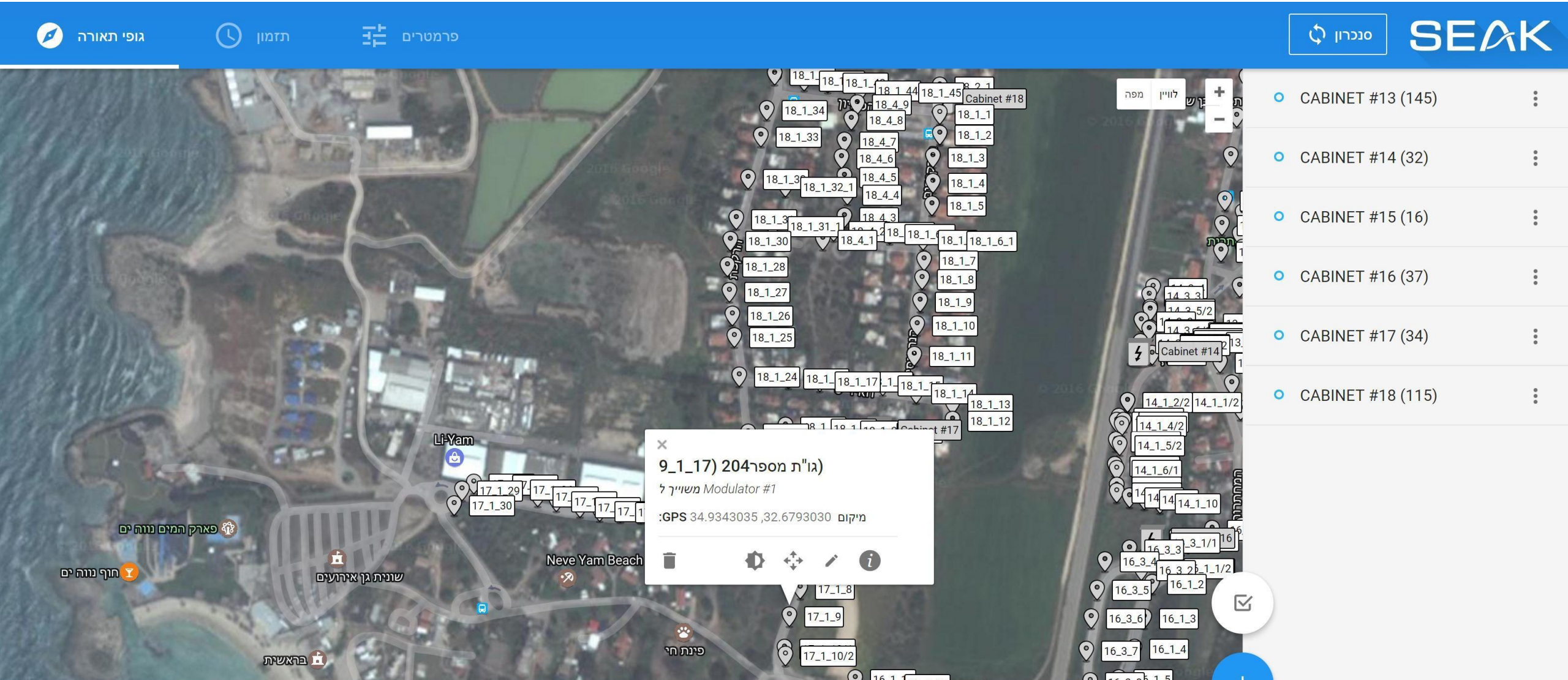
is controlled by Seak technology in Kyiv

and bring annual savings of € 2.1 million to the city



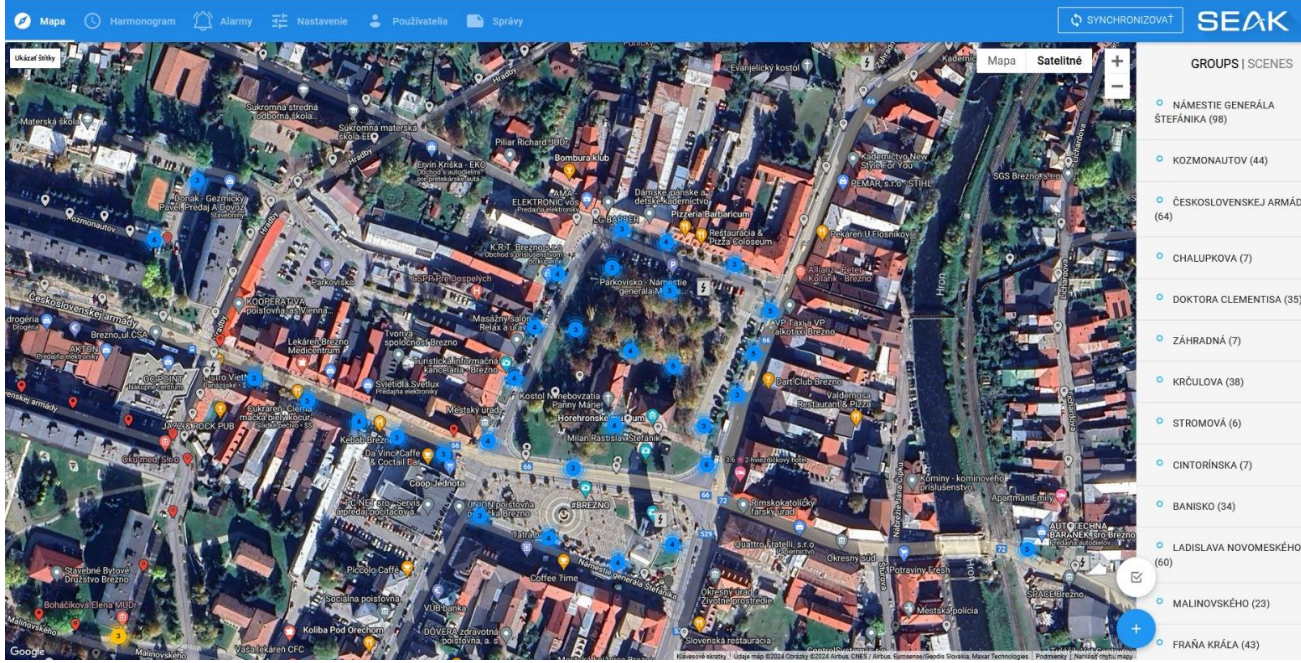
Over 30 municipalities in Israel use our technology

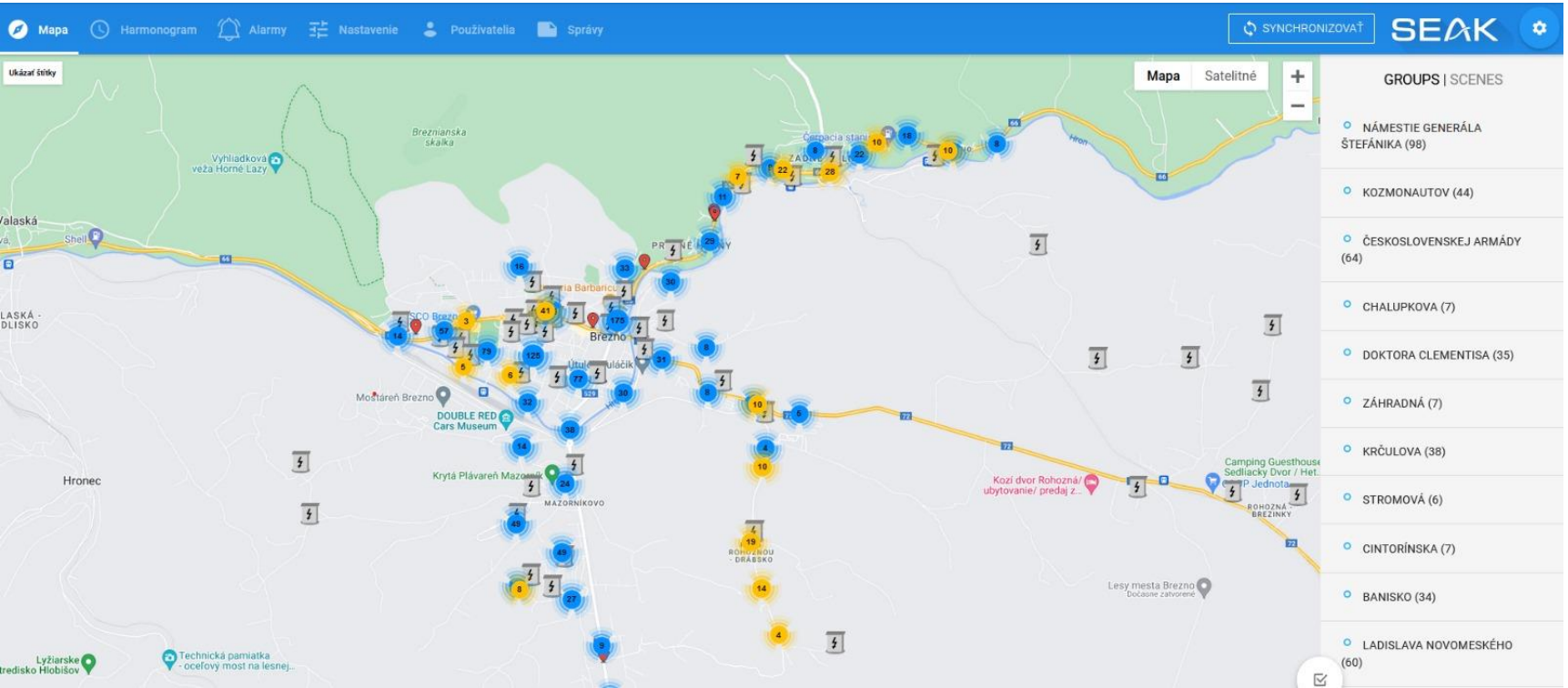
Tel Aviv, Rosh Haayin, Eilat....



Brezno, Slovakia

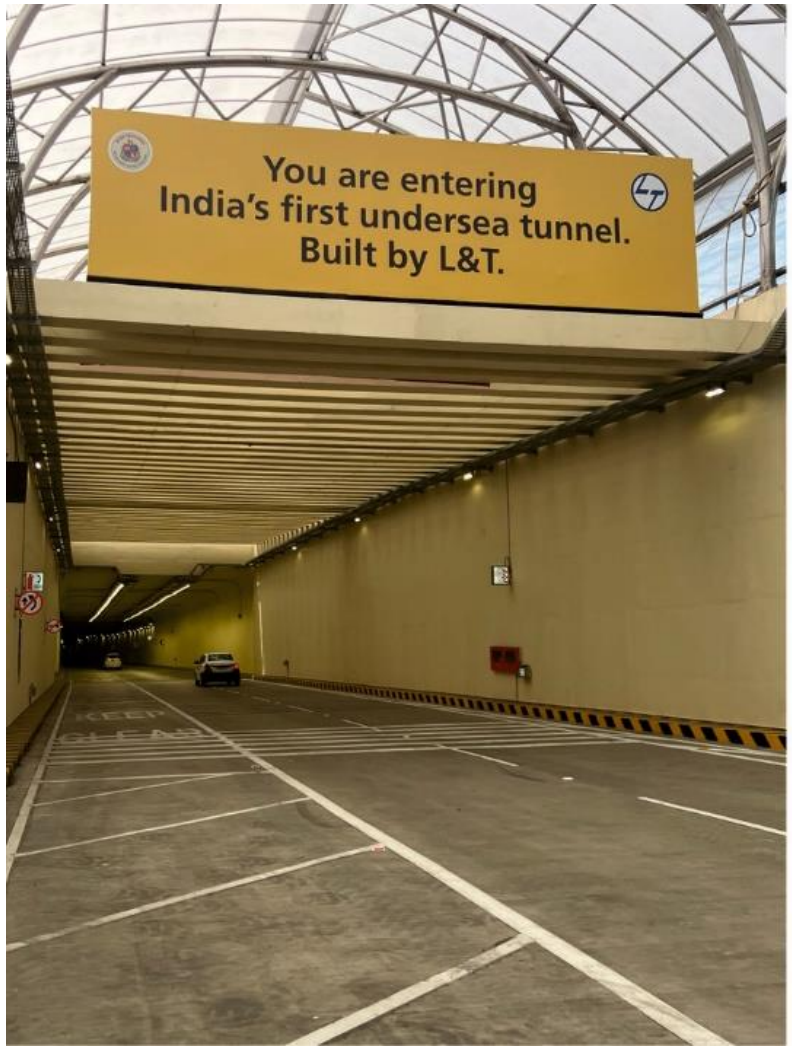
More than 1600 lamps

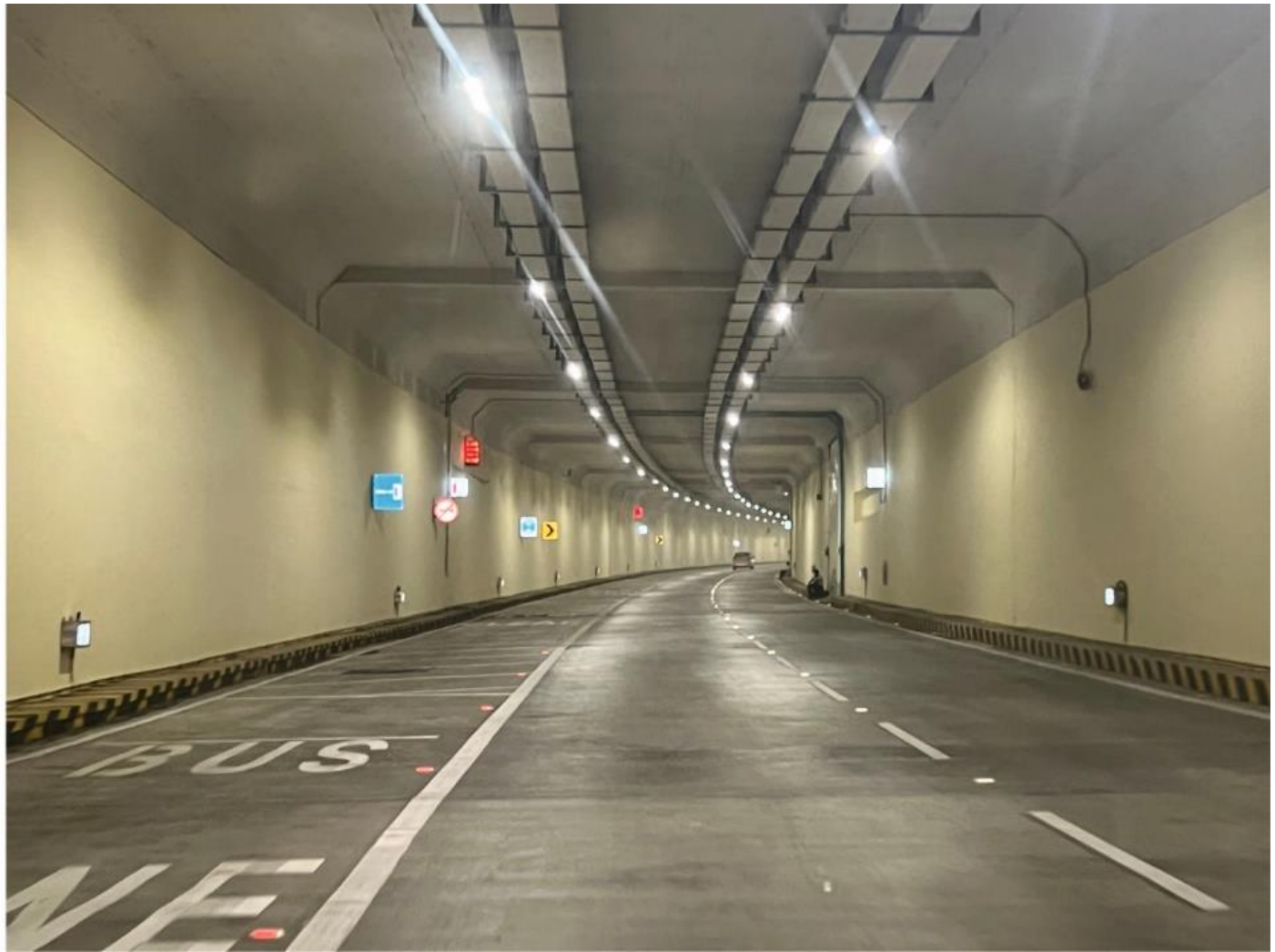




Mumbai, India

Lighting control in the underwater tunnel





TESCO stores – sale areas, malls, parking, warehouses

Most Tesco stores in the Czech Republic and Slovakia save more than 50% on lighting and maintenance costs

Volkswagen Bratislava, Slovakia

Reduction of energy consumption by 1 020 MWh per year

Savings with LED lighting	45%
Savings with LED lighting control	+28%

Ewijk, Netherlands – sports grounds

Variant light modes for matches, training and maintenance, on each field separately

Saving – LED lighting **45%**

Saving – Smart Lighting Control **35%**

WebUI – app for lighting control

Ewijk, Belgium, 4 football fields

Smart charging stations

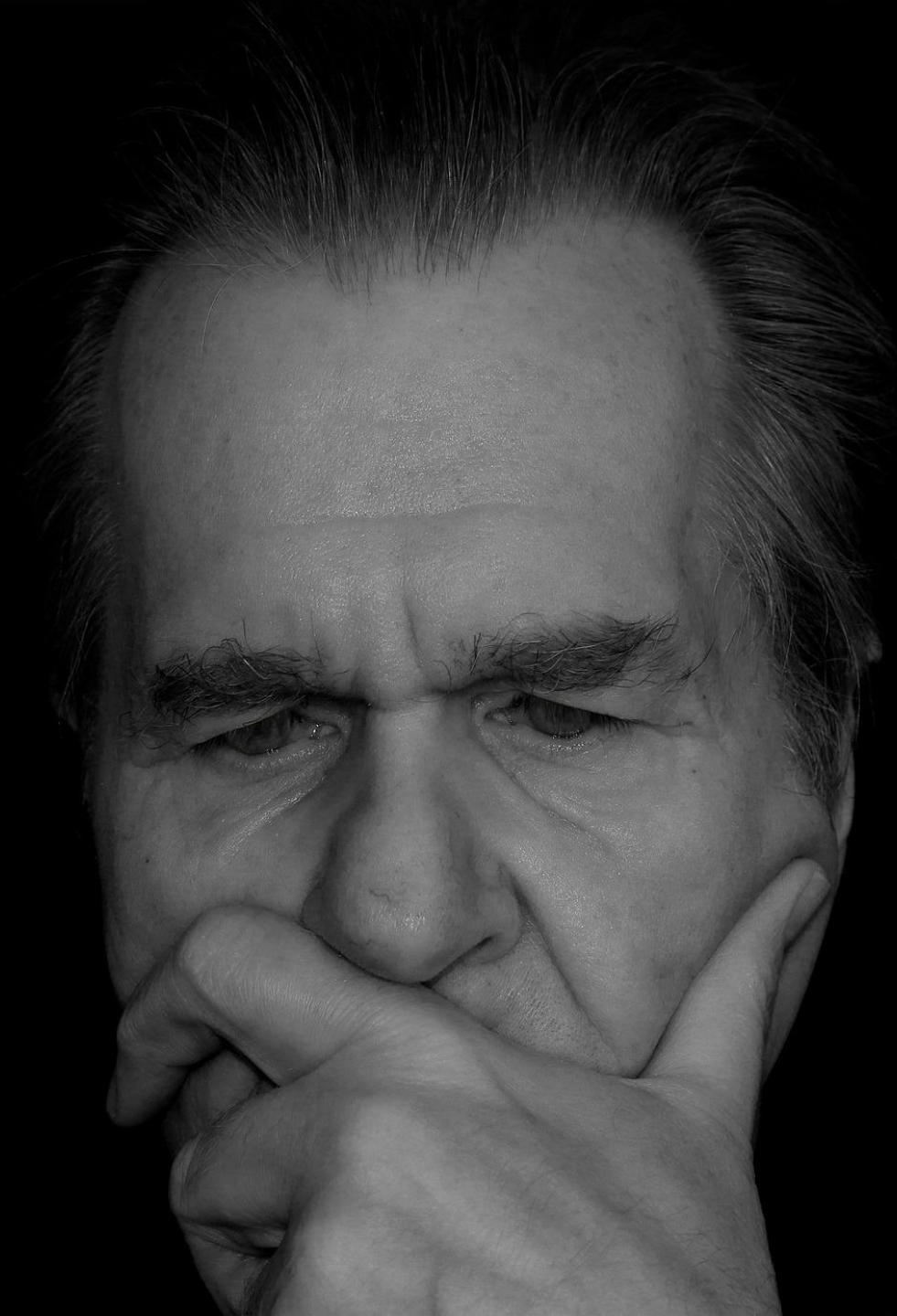
Netherlands
Utrecht

Slovakia
Sabinov

Ukraine
Kyiv

Chargeme.online – more than 20 operators use the charging app

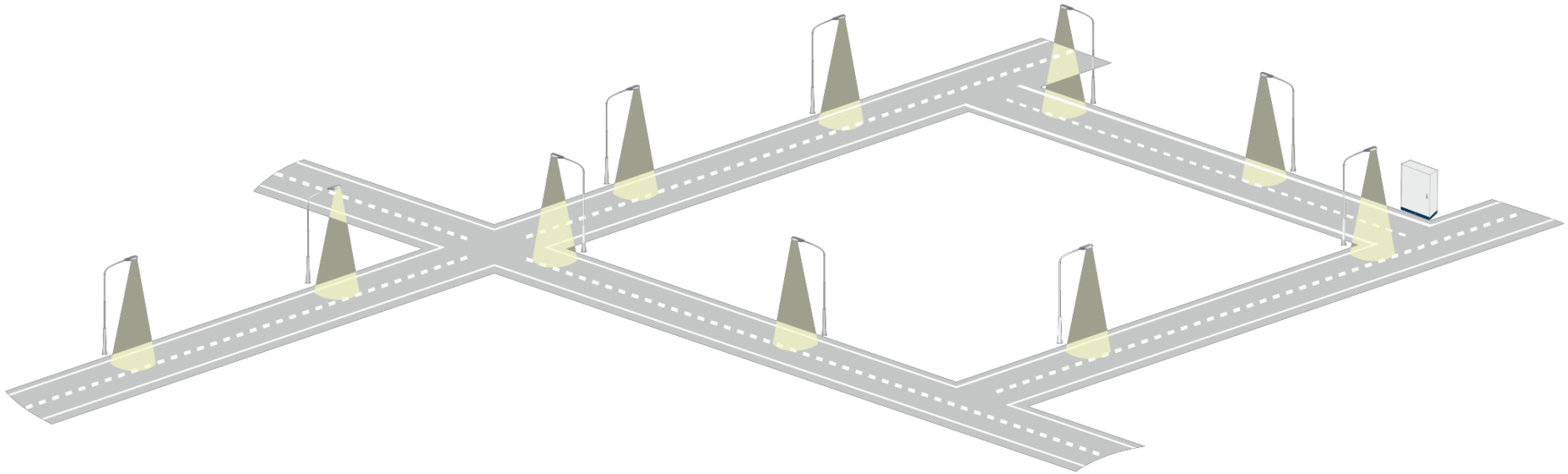
So – what is Smart lighting anyway?



SEAK powerline technology

What is Smart Lighting?

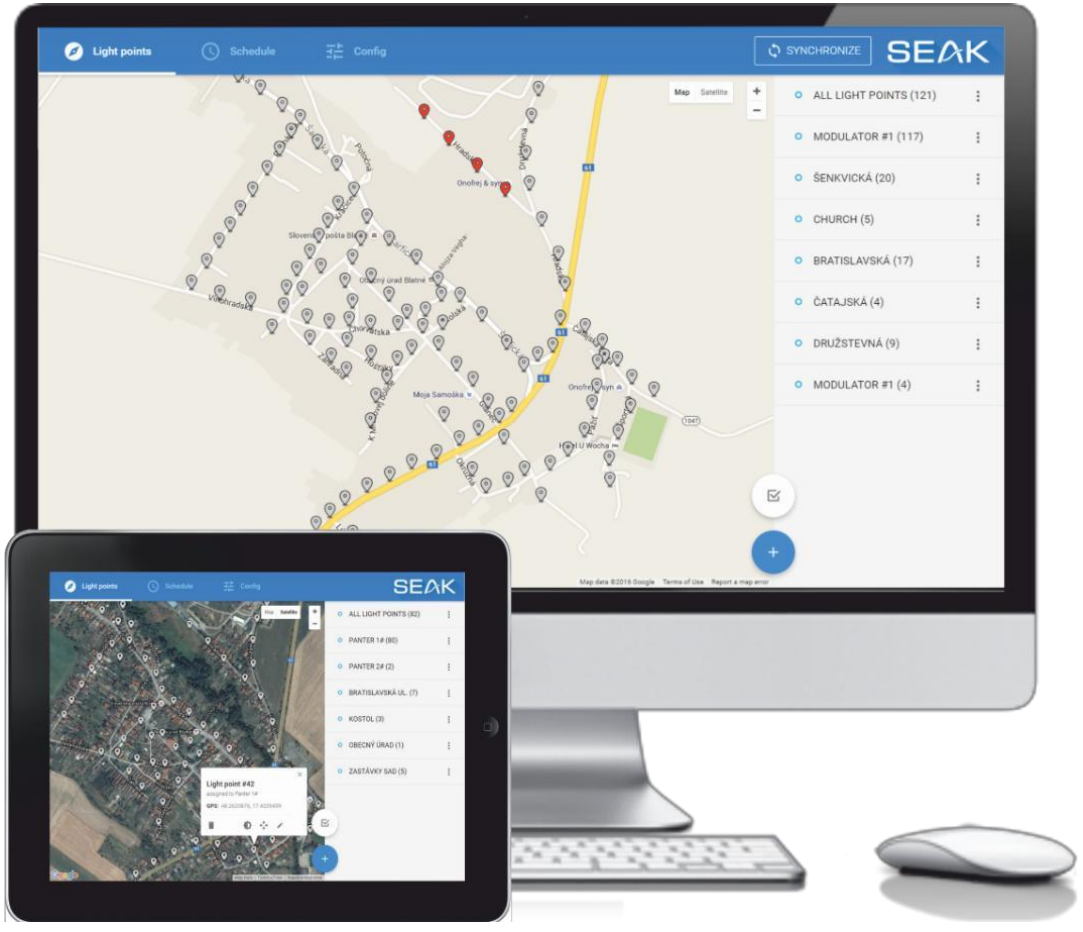
Remote control of each individual luminaire intensity
0% – 100%



SEAK powerline technology

What is Smart Lighting?

Remote diagnostics of each luminaire



SEAK powerline technology

What is Smart Lighting?

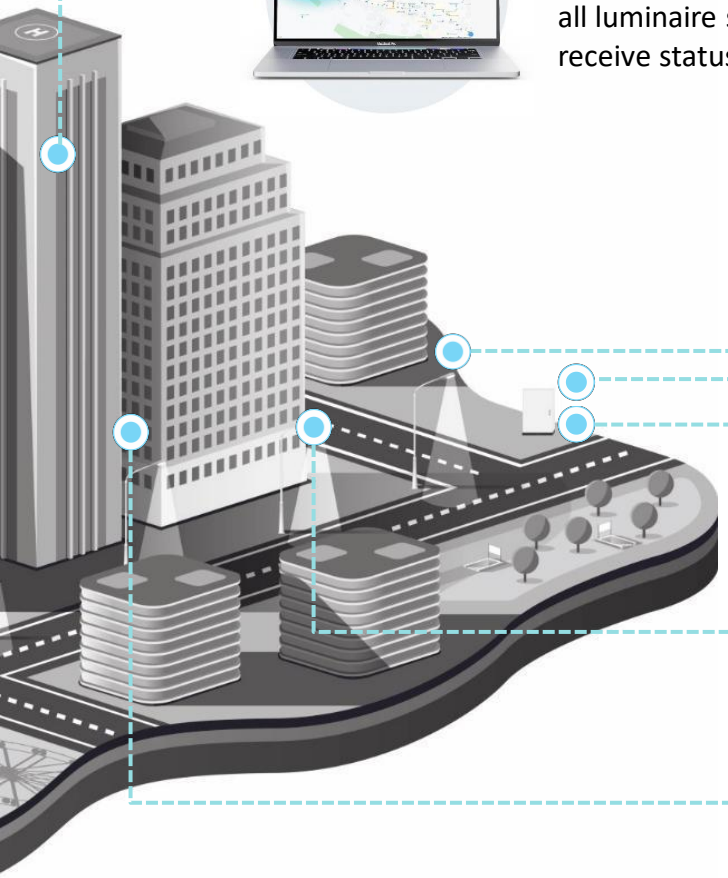
Optimized automatic mode (twilight and motion sensors)

Energy monitoring and reporting

Possibility to connect chargers for e-vehicles and other IoT devices and sensors

SEAK technology

Main components of the management system



Software
StreetLite
User-friendly app to control all luminaire settings and receive status reports

Charging station
LUMiCHARGER
Smart 22 kW AC charging station (in multiple formats) supporting integration with public lighting and IoT

LED DRIVER
SCC 30W - 250W
Connected to dimming module and wired to the LED. DALI or 0-10V.

Controller LUMiMASTER
SLC-NOM
Provides remote connectivity, management and automatic diagnostic functions in the system. Installed together with the LUMiBOX. Controlled via internet or SIM card

RS485

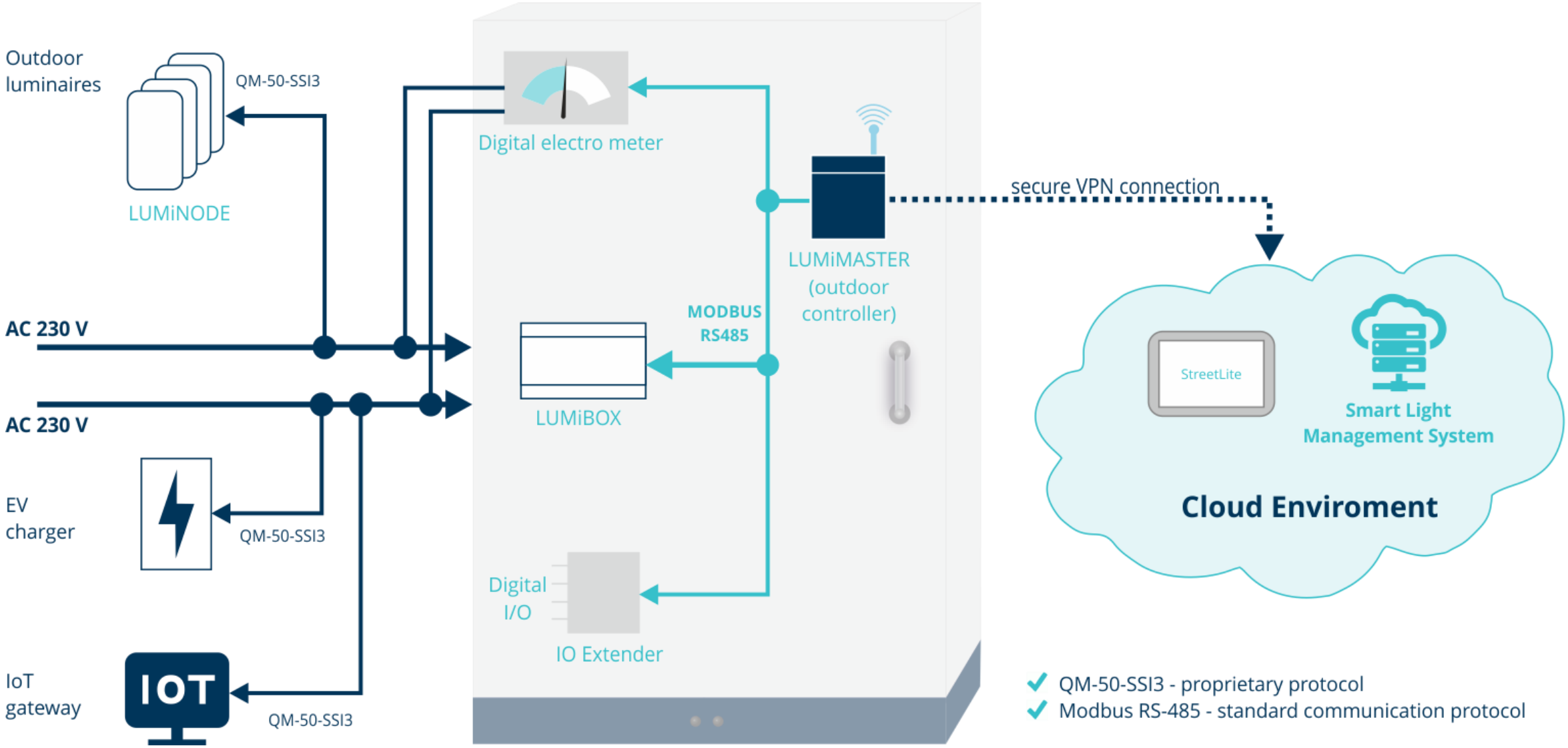
Modulator
LUMiBOX SLM
Installed in a “cabinet”. Forwards control commands to up to 255 luminaires through the powerline, and receives status reports back from LUMiNODEs.

230V

Dimming module (or demodulator)
LUMiNODE or LUMiBAR
Installed inside or on top of the luminaire, and wired to the LED driver. Reads commands from the powerline and (LUMiNODE only) controls the luminaire.

SEAK Technology

Main components of the management system



- ✓ QM-50-SSI3 - proprietary protocol
- ✓ Modbus RS-485 - standard communication protocol

SEAK Technology

Dimming modules

Modules	DIM BAR family	LUMiNODE family
Type of power line communication	One-way communication (control only)	Two-way communication (control + diagnostics)
Product variants	Output: PWM, 0-10V, DALI	Output: 0-10V, DALI, DALI DT8 (color) IoT sensors: RS232 Other: relay for 1000W/500W
Number of controlled drivers	max. 1 driver	max. 2 drivers compatible with DALI

SEAK Technology

Control Unit for Power Cabinet

- ✓ DIN rail mounting
- ✓ Input for pulse or digital (Modbus) electricity meter
- ✓ Min. 4 configurable digital inputs for twilight switch, door contact sensor, etc., expandable with additional inputs via Modbus
- ✓ Min. 2 configurable digital outputs for the main contactor, SSR, expandable with additional outputs via Modbus
- ✓ Built-in Ethernet port and GPRS/EDGE router/4G or 5G (optional)
- ✓ Built-in web server for configuration/diagnostics
- ✓ Built-in security features: firewall, SSL support and VPN client
- ✓ Built-in astro clock specifying sunrise / sunset time from GPS position and exact time
- ✓ DDNS support for easier management
- ✓ NTP support for automatic time synchronization
- ✓ RFC2217 serial tunnel support for remote diagnostics equipment in the switchboard
- ✓ Operating temperature range at least -35 ^{o}C ~ +75 ^{o}C
- ✓ Operation independent of internet connection, control unit works autonomously after setting
- ✓ Backup battery to send an alarm status in case of power failure
- ✓ Automatic restoration of the correct light intensity when finished power failure Automatic control of contactor
- ✓ Possibility to turn off the lighting (stand-by) during the day, while the power line is under voltage 24 hours
- ✓ Possibility to control different types of luminaires (LED, HID MH) in one system
- ✓ Possibility to control biodynamic lamps (tunable-white) as well architectural colored lights
- ✓ Support for integration of electric car chargers with shared power balancing (dynamic load balancing - DLB)
- ✓ Check of exceeding the maximum reserved capacity
- ✓ Remote software update Input for modulator (Modbus) providing power line communication
- ✓ Charger management backend communication with OCPP 1.6J standard

SEAK Technology

Power Modulation Unit for Electrical Cabinet

Communication interfaces

RS485, Two-way powerline communication QM-50-SSI3

3 basic types according to max. working current

SLM-140 – max. 40A

SLM-160 – max. 60A

SLM – 1100 – max. 100A

SEAK Technology

StreetLite Software

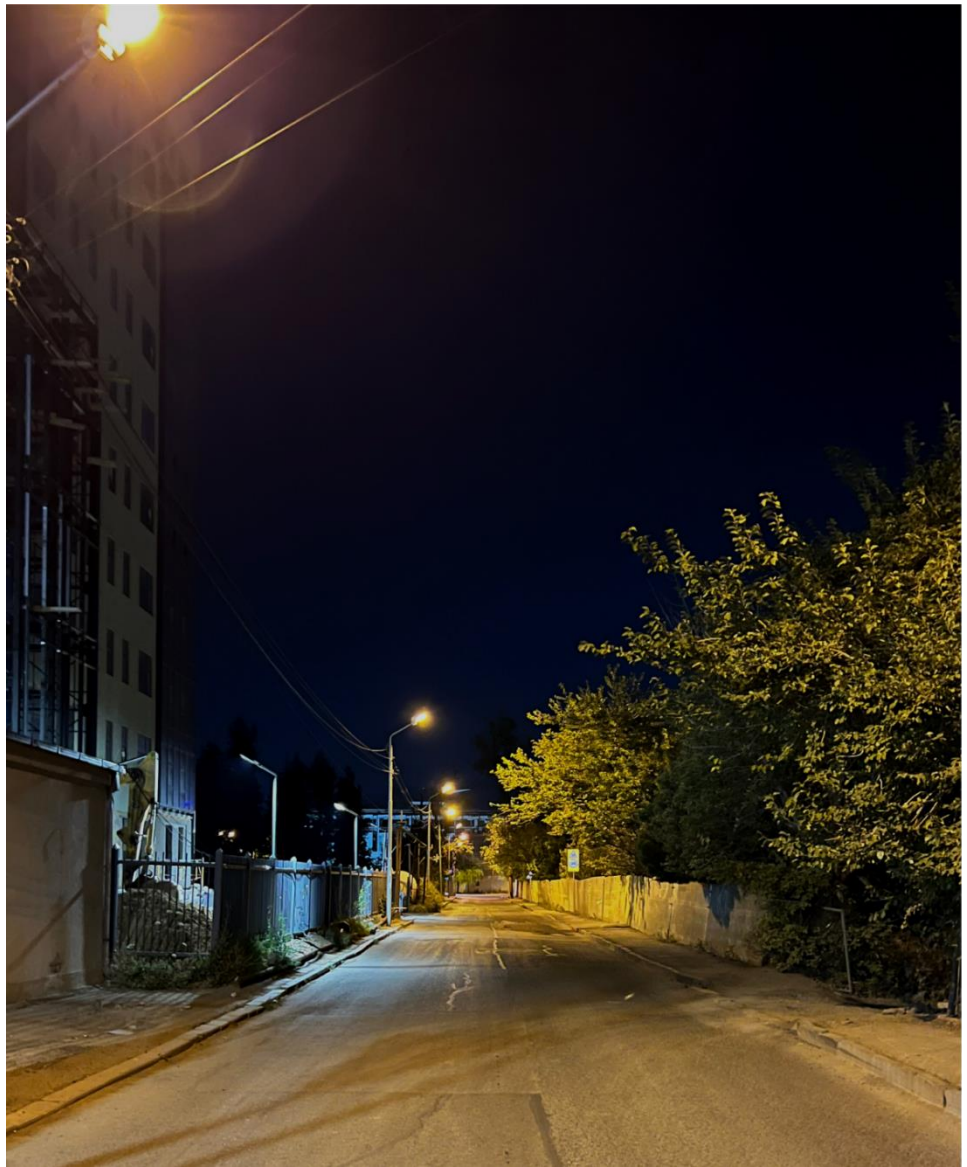
Control and management

Using an app in the cloud

- Sorting luminaires into groups(main street, park, residential zone, ...)
- Setting the dimming schedulefor each luminaire group
- Change parameters remotely at any time
- Reports on energy savings achieved

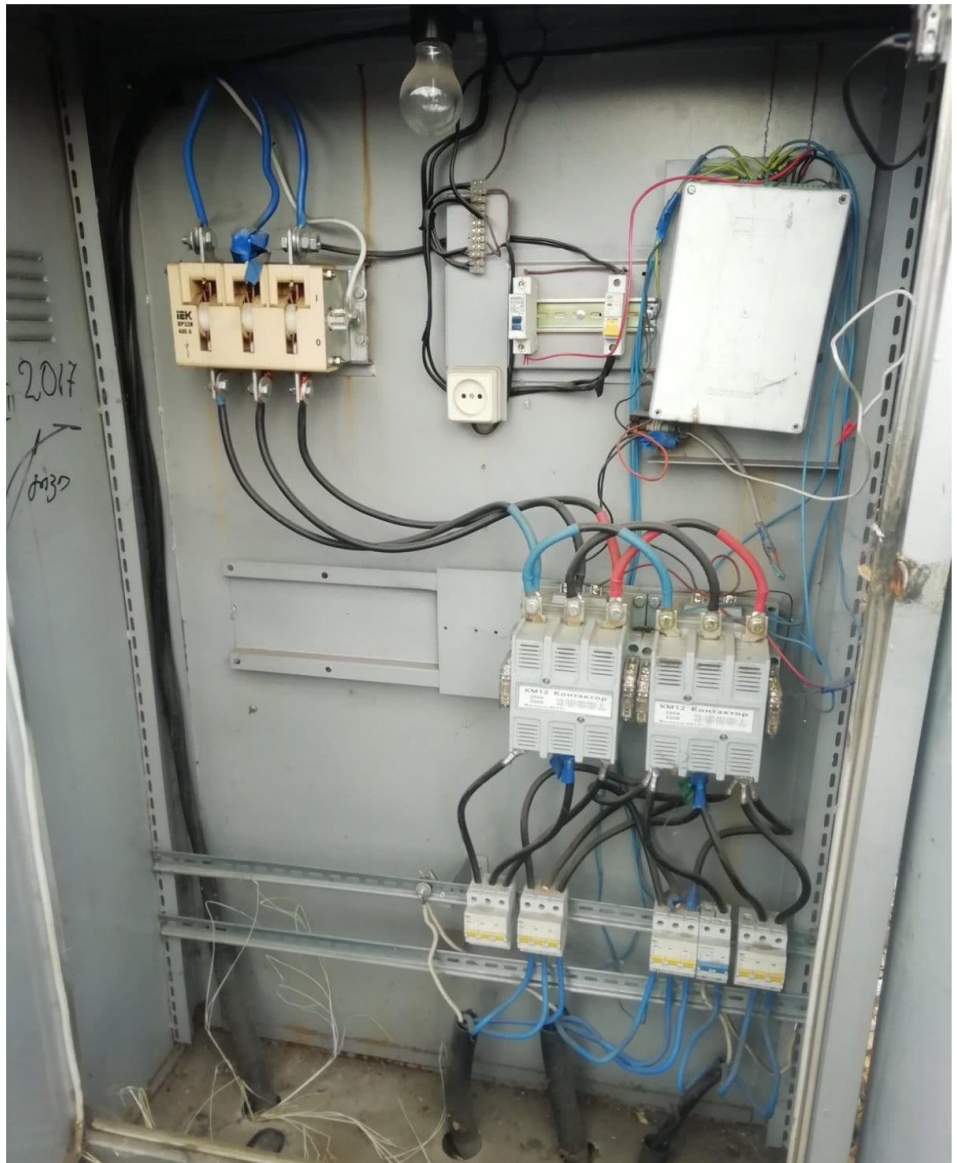
SEAK Technology – Ljubljana street Tbilisi - Georgia

Example of use before and after reconstruction of public lighting



SEAK Technology – Ljubljana street Tbilisi – Georgia

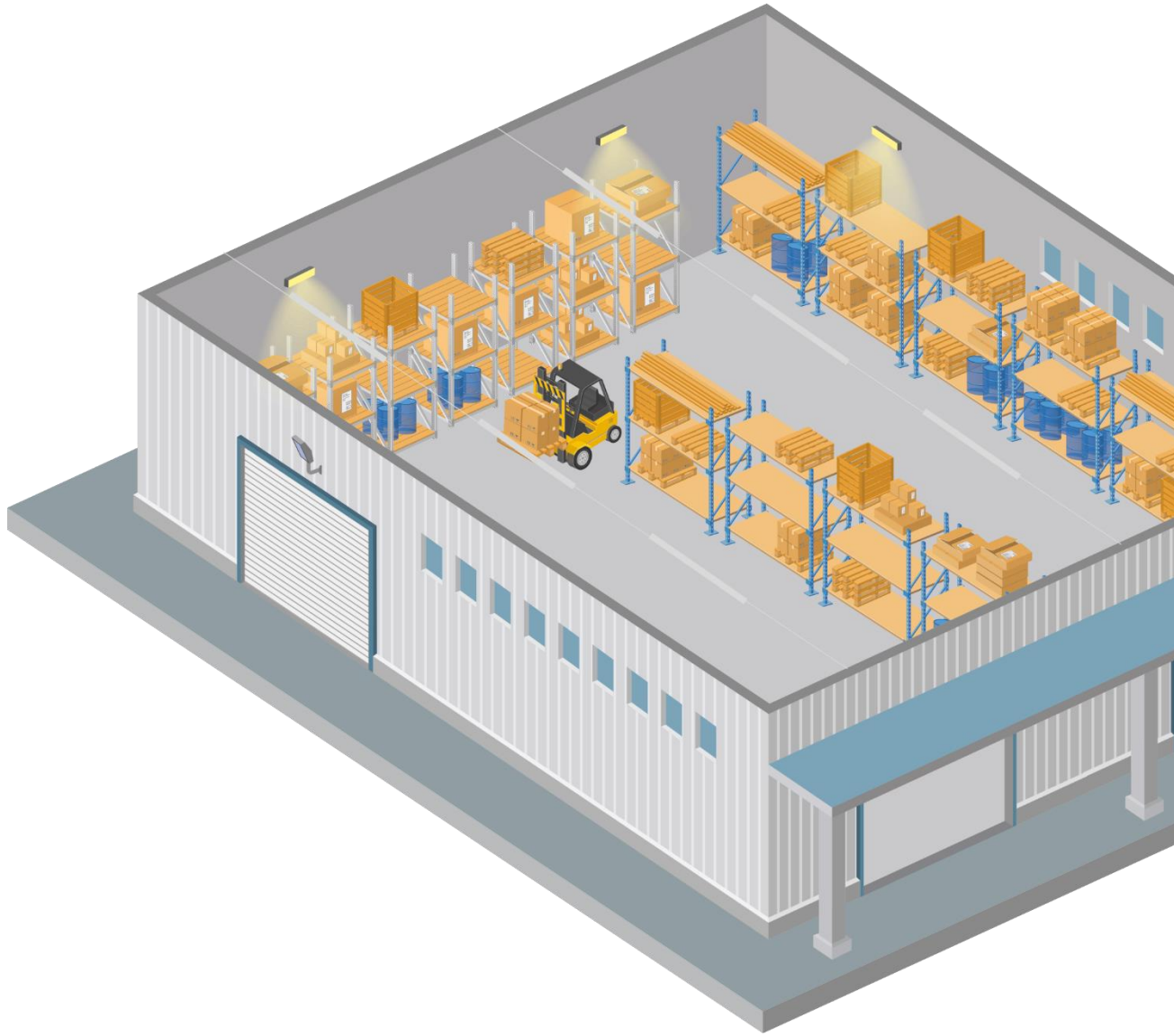
Example of use before and after cabinet reconstruction



SEAK

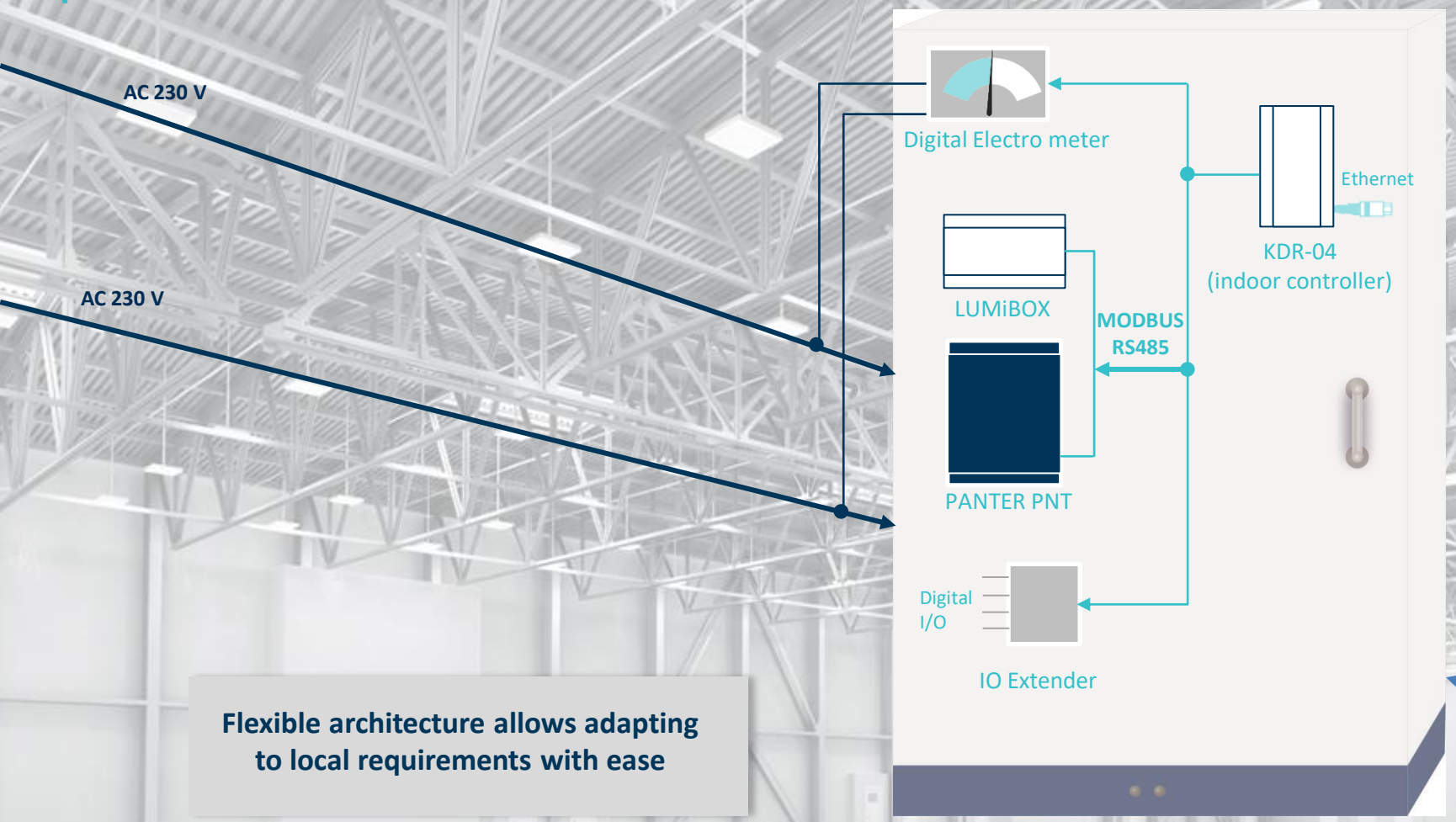
SEAK Lighting Control

INDOOR



Each luminaire gets a powerline communication module, by which it gets a unique ID

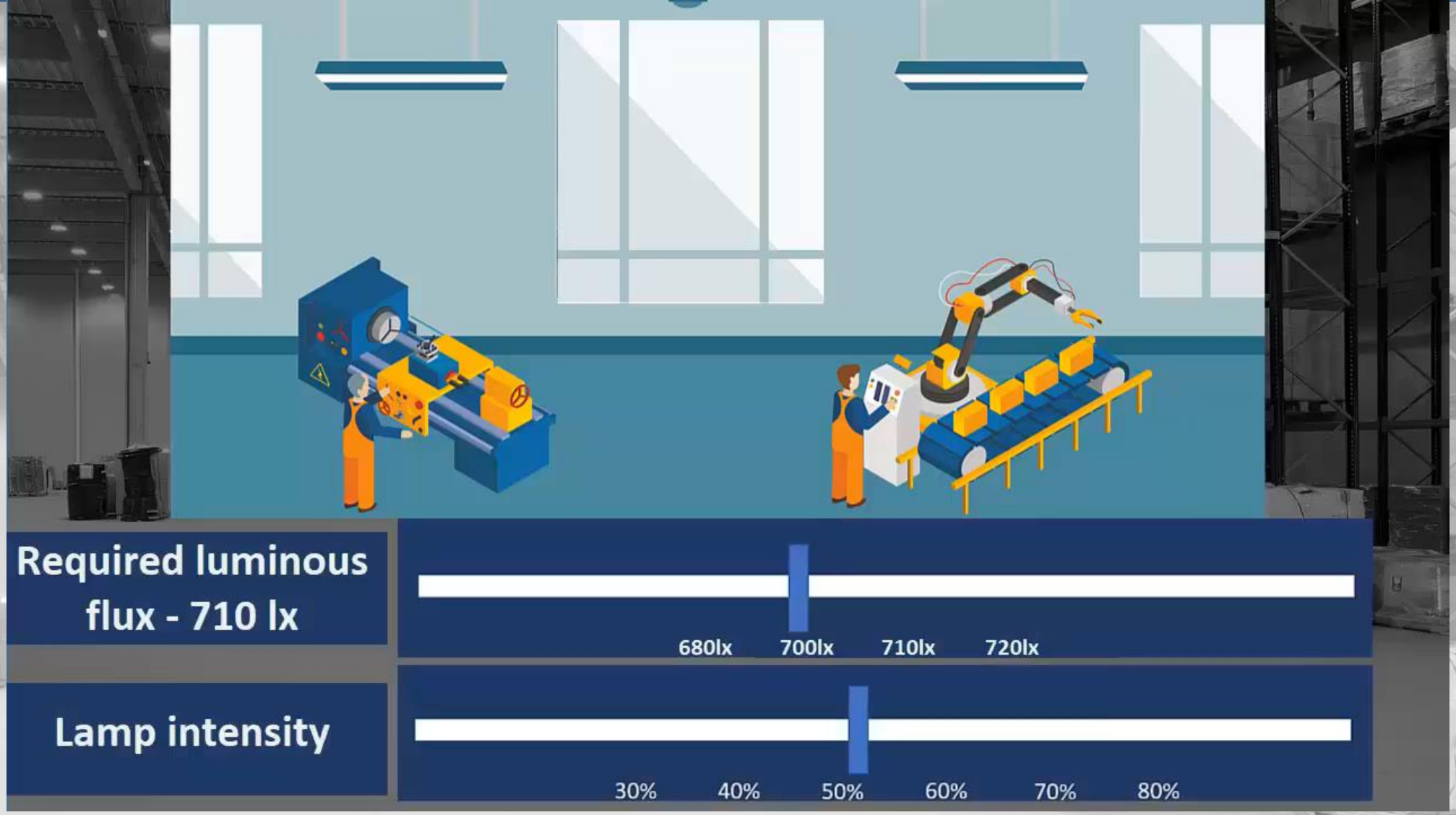
Electrical cabinets get SEAK modulators



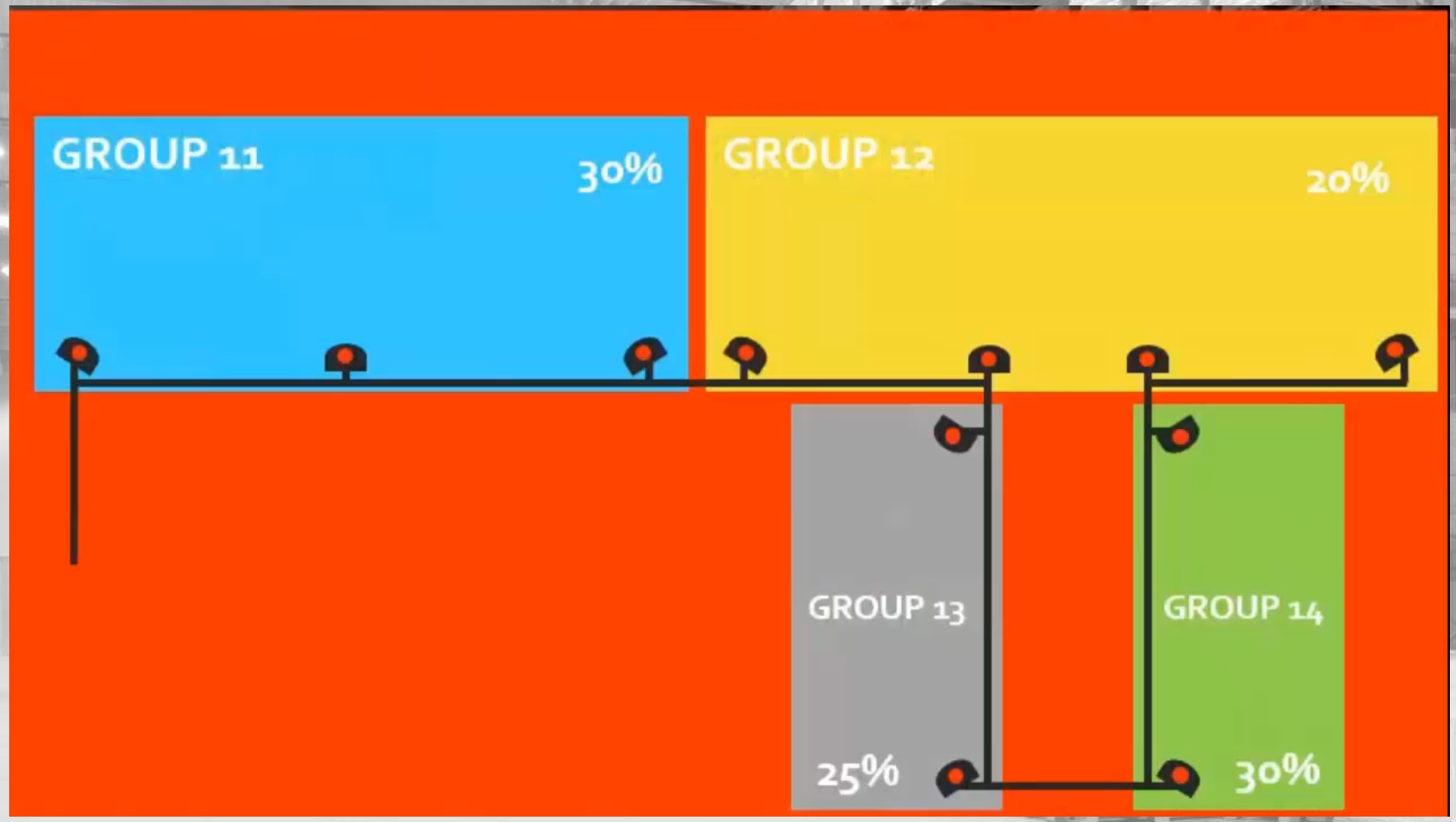
Flexible architecture allows adapting to local requirements with ease

Lights are assigned to logical groups in the software

Lighting control in Iskra arena Svit



System will automatically balance lamp intensity to provide accurate lighting at minimum consumption



Add motion sensors as needed

When you decide to change the usage of particular space in the building, to adapt the lighting is just a software config.

Lighting control can be offered as a service.

Control of the colour temperature of the light is also possible via power line

3000K Temperature Lighting 6000K

We also control colour lighting and colour scene management

Use your tablet or smartphone to control lighting

Where does the smart lighting installation have economic return?

The savings depend on the lighting properties of the space and its use

A space with variable lighting level requirements		No daylight	Small windows / skylights	Large windows / skylights
Motion sensor (occasional motion)	operation 8h /d	35-40%	45-50%	60-65%
	operation 16h /d	35-40%	40-45%	55-60%
	operation 24h /d	35-40%	‹40%	‹45%
Without motion sensor	operation 8h /d	10-15%	25-30%	40-45%
	operation 16h /d	10-15%	20-25%	35-40%
	operation 24h /d	10-15%	‹20%	‹35%

Where does the smart lighting installation have economic return?

The savings depend on the lighting properties of the space and its use

Warehouse

Logistics hall

2-3 y.

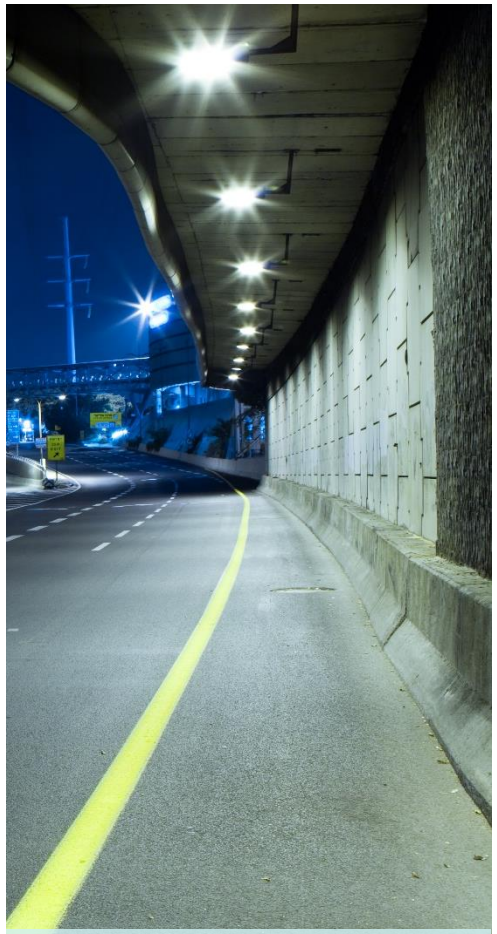
Large shop with windows

2-4 y.

Production hall with windows

3-5 y.

Outdoor parking with sidewalks

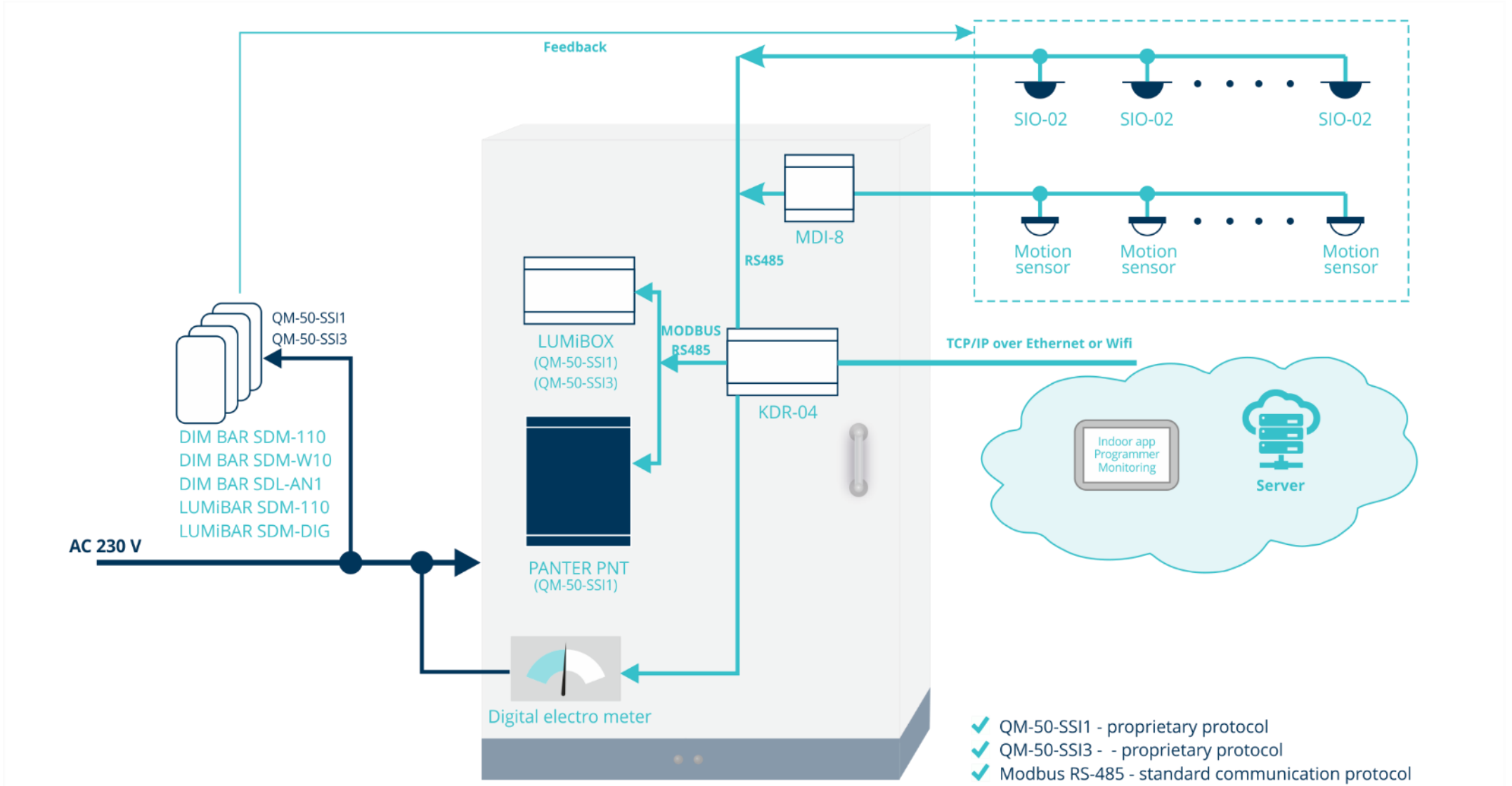


3-5 y.

Office space

5-8 y.

The whole lighting management system can be integrated with the BMS using standard protocols



SEAK Charging stations

integrated with

public lighting

Available AC charging station with max. 22 kW

with load balancing function

SEAK system supports EV chargers mounted on lamp poles, that communicate with our lighting control system to negotiate the power available for EV charging.

POLECHARGER

Wallbox, metal

LUMiCHARGER LP

Selfstanding pole with 2 sockets in a lamp column

LUMiCHARGER S2S

Selfstanding pole

Integration with lighting control

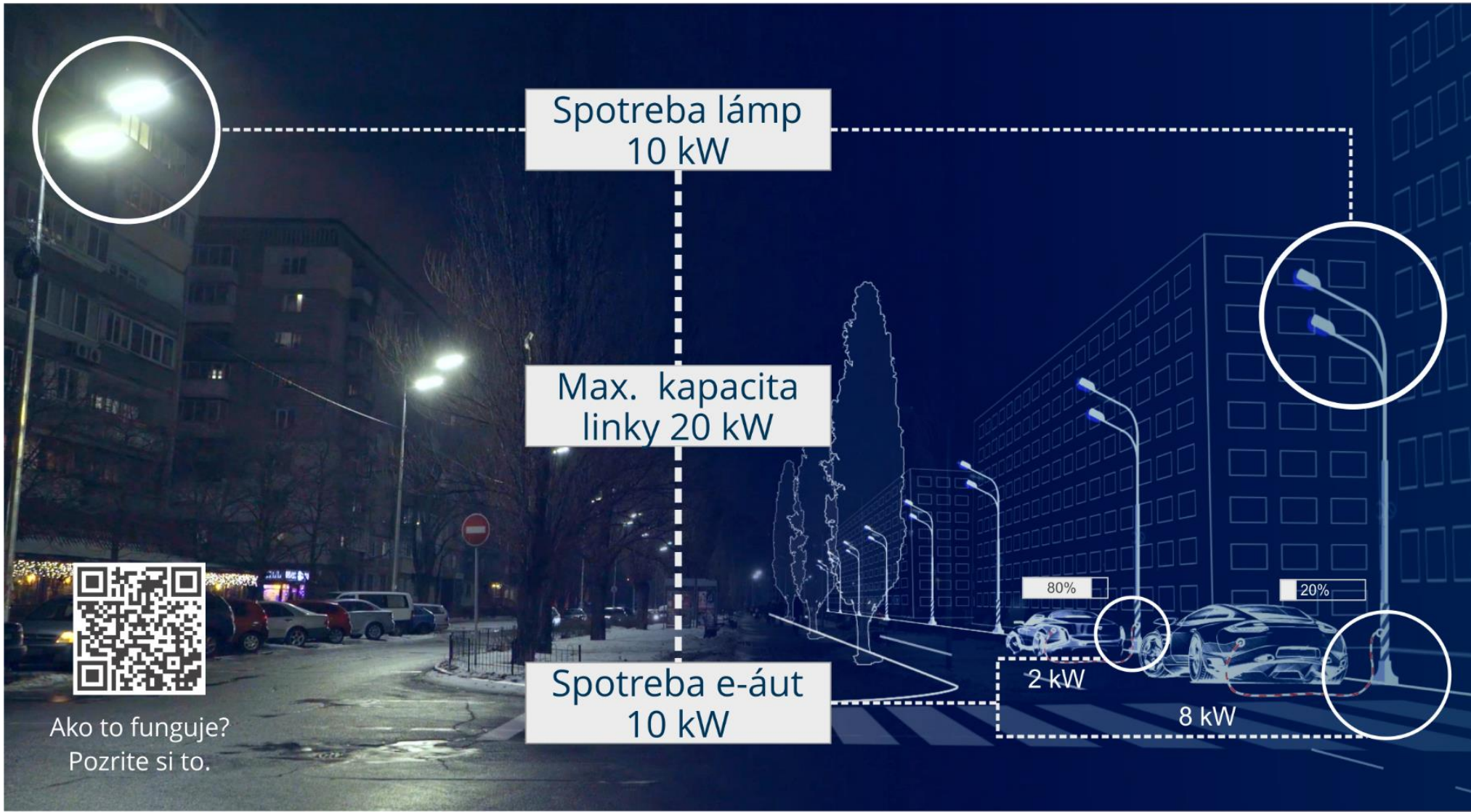
with load balancing function

At Day

Full capacity for charging

At night

Lighting takes priority, remaining capacity is redistributed among connected cars



Smart lighting & EV charging using existing power lines

Example of the use

Day: Luminaires at 0 %

Line capacity: 30 kW

Charging: 15 kW | Charging: 15 kW

Smart lighting & EV charging using existing power lines

Example of the use

Night: Luminaires at 80 %

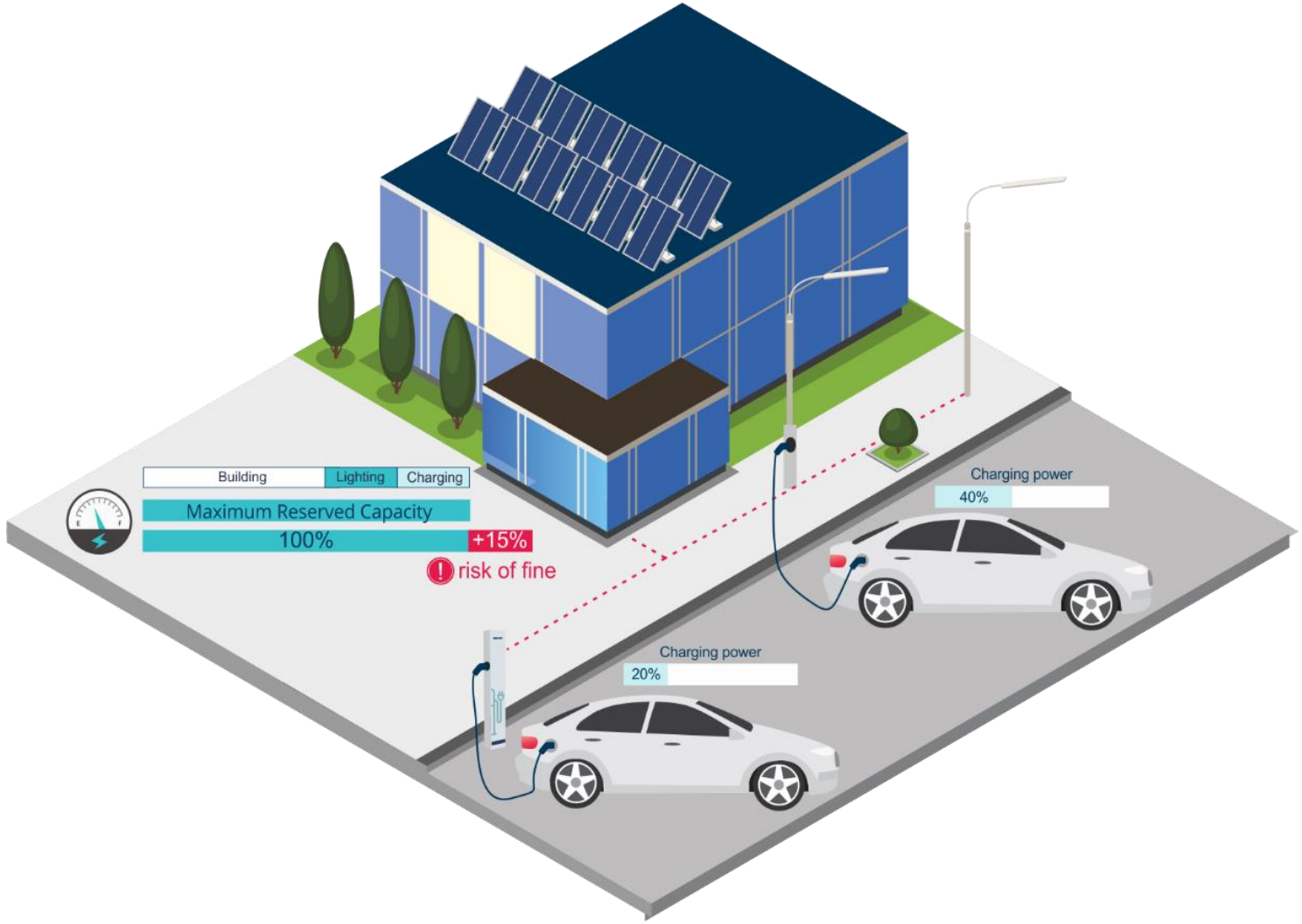
Line capacity: 30 kW

Charging: 25 kW

Light: 5kW

Dynamic Load Management

Manage energy consumption in the building



Dynamic load **management optimises the charging rate** so that maximum energy is used for the building **and the maximum is not exceeded.**

For example:

ECO only charging charges only from solar energy (we dynamically control charging based on PV output = zero charging costs

Free charging during opening hours only

Choice of Eco free or 22 kW with payment

Existing power lines are used for communication between cabinets, lamps and chargers

Significantly lower costs for the lighting operator when installing chargers

Optional payment via charge.sk

If the customer wants to charge at full speed, let's make it possible

App charge.sk for LUMiCHARGER

- remote monitoring and management of charging stations
- **dynamic pricing-** more expensive charging at peak times, more favourable off-peak prices
- possibility of **integration with local online payments**

Ready for IoT

The future is in data

SEAK modules support communication over existing wiring with third-party devices,
e.g. air quality sensors, noise sensors, traffic density sensors, etc.

Smart lighting with meteo sensors installed in Sabinov

References

Nearly 900,000 luminaires controlled by Seak technology

Spain

- Barcelona
- Cordoba
- Sevilla
- Valencia
- Malaga

UK

- London – M25 motorway
- Aberdeen

Czechia + Slovakia

- Indoor lighting controls Tesco
- Indoor lighting controls Volkswagen
- 70+ cities in CZ and SK

Austria

- Massendorf, Mank
- Woebling

Benelux

- Ewijk, Vinray

Ukraine

- Kiev
- Mena, Zhytomir, Pavlograd
- Kharkov (pilot)
- UHLK
- Radiy

Prešov

- SEAK HQ

Serbia

- Plandiste

Russia

- Uralskyj
- Astrachaň

Israel

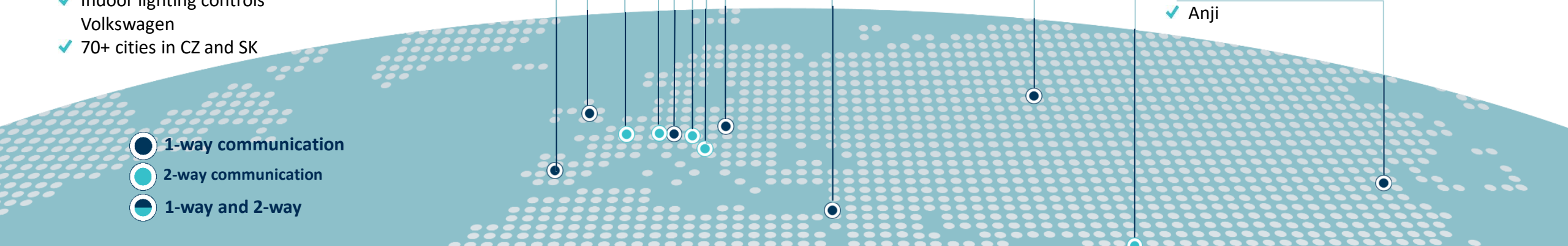
- Tel Aviv
- Rosh Haayin
- Rishon Le Zion
- Atlit

India

- Thane (pilot)

China

- Anji



1-way communication

2-way communication

1-way and 2-way

SEAK

Smart lighting control in the cities and buildings

Smart EV charging in public lighting columns

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