



**QULON**

# Smart Lighting *for even Smarter Cities*

QULON is a powerful yet extremely flexible Central Management System for street lighting. A combination of software applications and different hardware technologies that will offer you full control over any kind of lighting network enabling activity scheduling, real time faults notification, remote meter reading, performance analysis, custom dimming scenarios creation, maintenance workflow management and much more, increasing efficiency and cutting down costs.



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to monitor, analyse, manage and schedule lighting performance from any device



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Reliable individual controls for cabinet-based infrastructures with Powerline Solution

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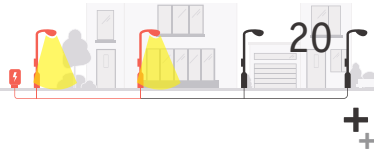
based on 868/915 MHz narrow band or mesh network to control your lighting without any interference

## 14 versatile GSM Solution

to connect your lights directly to the QULON server

## 17 Architectural Lighting Controls

We can also integrate in a single interface



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simple, reliable and affordable



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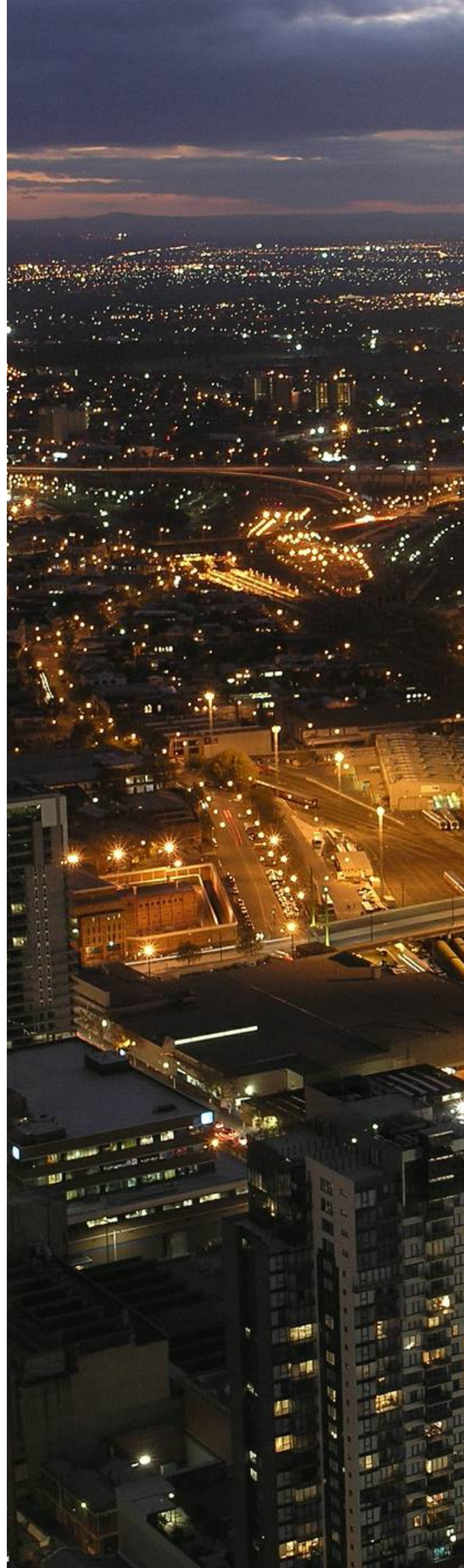
on traditional lighting for increased energy savings

step  
by Step

24 How to get started?  
Here's our **Step by Step Guide**

## 28 and Sensors and Add-ons

to make your system even smarter





An aerial night view of a city, showing a dense network of lights from buildings and streets, with major highways and interchanges illuminated. The sky is dark with some light clouds, suggesting dusk or dawn.

## Full Control of your Lighting Network

Every lighting fixture in your city, no matter whether LED or HPS, can be connected into a unique networked environment. Take command of all your street and architectural lighting regardless of your network structure by connecting them to QULON: Create and manage dimming scenarios and be constantly aware of any malfunction.

## Save More With QULON

QULON is created to help municipalities to save on energy and maintenance costs. Save up to 80% of lighting-related costs simply by managing lighting levels and implementing smart profiling to deliver lighting when and where it is needed.

## Visualized Smart Data

QULON offers rich data visualization tools as well as real-time, map-based view of live status of any lighting point. Flexible reporting and documentation of all operational process enable a more effective control and decision making.





# a Wide Portfolio of Solutions

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Excellent lighting control  
in every part of your city

Every city is unique: Different infrastructures, different terrain and climate conditions, and different requirements when it comes to public lighting. QULON by Sundrax provides management tools to connect all your city lighting into one flexible platform in order to provide better, safer and more affordable lighting for smart cities.

Of course, the complex nature of a city makes it impossible to use a single approach to control lighting in its different parts, such as parks, highways, tunnels, residential areas, as well as dimming non-LED lights still present in the network. This is why QULON employs different technologies to meet any city lighting requirements within a single software interface, granting full control of the urban lighting network in its complexity.



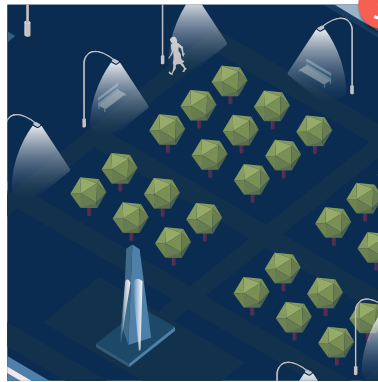
### Main streets

LED lighting. Individual lighting control. Integration with architectural lighting. Energy saving dimming from 12 to 6 AM



### Bus stops, pedestrian crossings

LED lighting. Individual flexible dimming profiles. Power supply from solar panel. 0% consumption.



### Public parks, recreation zones

LED lighting. Individual lamp control. Motion sensors turn on the lights only where needed.



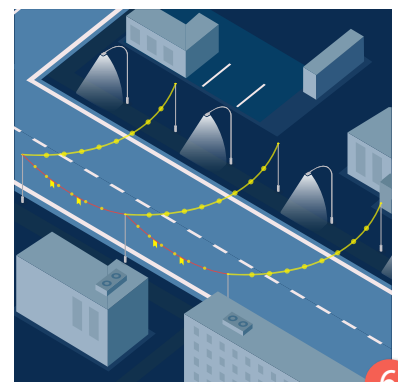
### Highways

Group control. Traffic intensity sensor. Dimming profiling based on traffic intensity.



### Quiet neighbourhoods

Group control: phase dimming, simple group lighting management.



### Architectural and Festive Lighting

Integration of public architectural lighting installations into your city's street lighting management software.

# Drawing a Fine Line

We all share the desire to live in a safer and greener environment: At QULON we focus our efforts on developing smart technologies that provide better lighting both functionally and aesthetically, helping companies and local communities to improve people's quality of life by creating efficient and visually unique infrastructures, as well as preserving the environment by drastically reducing their carbon footprint. From small towns to megacities, municipal governments all over the world are facing huge challenges presented by this fast and demanding process of urban transformation. The increasing costs of infrastructures and utilities, the limited budgets as well as the pressure of environmental issues and strict regulations are some of the biggest obstacles to this renovation: As a company we are well aware of these issues, and we can find the best option for your needs in the vast range offered by our QULON Light Management System portfolio of solutions.

Let us provide you with a project-oriented, intelligent and cost effective design to optimize your lighting infrastructure, whether for a road, parking lot, street, highway, industrial complex, railway, airport or else, and start saving energy today, optimizing costs and defending the environment.

**35,000 kWh or £5,000**  
is saved each year per 1 km  
of motorway with intelligent  
light management in the UK

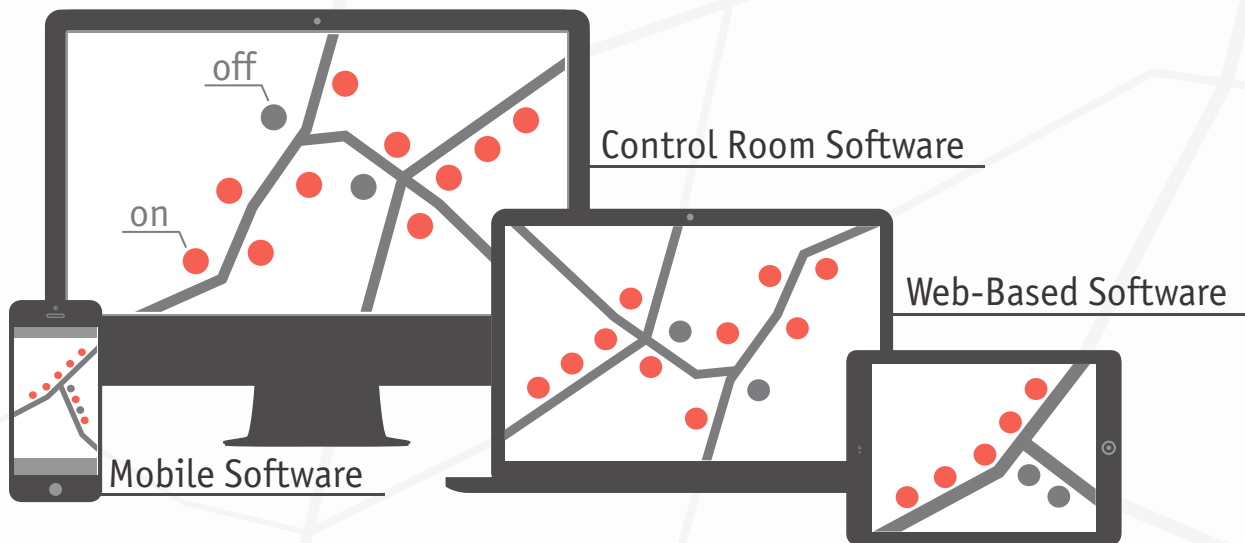
**40% of energy and 50%**  
of maintenance costs  
may be saved by smart  
light management only.

**Up to 40% of city energy**  
budgets are spent on outdoor  
lighting.

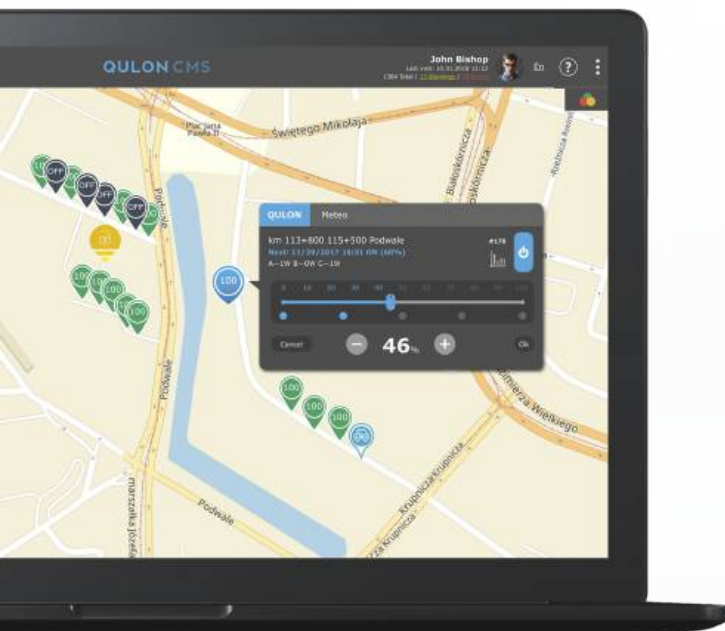




# Remote Control & Diagnostics for Street Lighting



## Live Management



Manage your assets remotely straight from the map: regulate light levels, create dimming scenarios, and adapt luminaires behaviour according to the inputs of a broad range of sensors. Configuration interface is simple and intuitive: save and apply dimming profiles, group and ungroup luminaires, allocate different zones to different operators.

QULON provides an extremely flexible lighting programming solution with graphical representation of live status of street lighting assets precisely located on the map via GPS.

Additional safety is provided by built-in autonomous lighting patterns activated in case of connection failure (until live connection is re-established).



# Live Monitoring

## Live Status

QULON shows live status with precise positioning: You can get information about current dimming level, alarms, warnings, triggered sensors, and disabled connections straight on the map with no additional clicking.

## Event Log

No night scouting and truck rolls – everything that is going on with your lights is now available through event log: any change of luminaire status, deviation in consumption, connection failure, power shortage, login event, appointed and complete maintenance tasks, theft alarm, sensor data... just to name a few!

## Precise Stats

QULON provides perfect power consumption monitoring by improved graphic interface of lighting performance. Notifications and alerts are received immediately when a certain parameter crosses a set threshold value. Notification via email and text message is also available.



## Visualized Data

QULON generates graphic data breakdown per single luminaire or customized groups, both live and for logged data. Measured current, power factor, cumulative power (kWh/kVAh), active and apparent power, voltages, current and voltage per each phase, and other parameters are carefully collected and presented as comparable graphs or tables.

## Reporting Tools

Optimizing energy efficiency with customized reports is easier than ever: Information about errors and warnings, power consumption, financial savings, or tasks performance status are scheduled for emailing daily or weekly per single luminaire, groups or the whole system. Custom user-defined reports are also available – another feature contributing to the QULON reporting tool's unequalled flexibility.

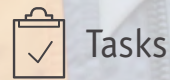


# Task Manager

Workflow app to simplify maintenance

The new QULON workflow app makes planning and management of maintenance tasks simpler and more effective. Managing the maintenance workflow of your street lighting network will be quick and simple: Schedule and assign maintenance tasks, control performances, and divide installations amongst contractors straight from the app.

- Monitor fixtures status and life cycle
- Performance-based maintenance tasks
- Assign tasks and control maintenance teams from the map
- Request third party support
- Log and document your maintenance works



Tasks



Alarms

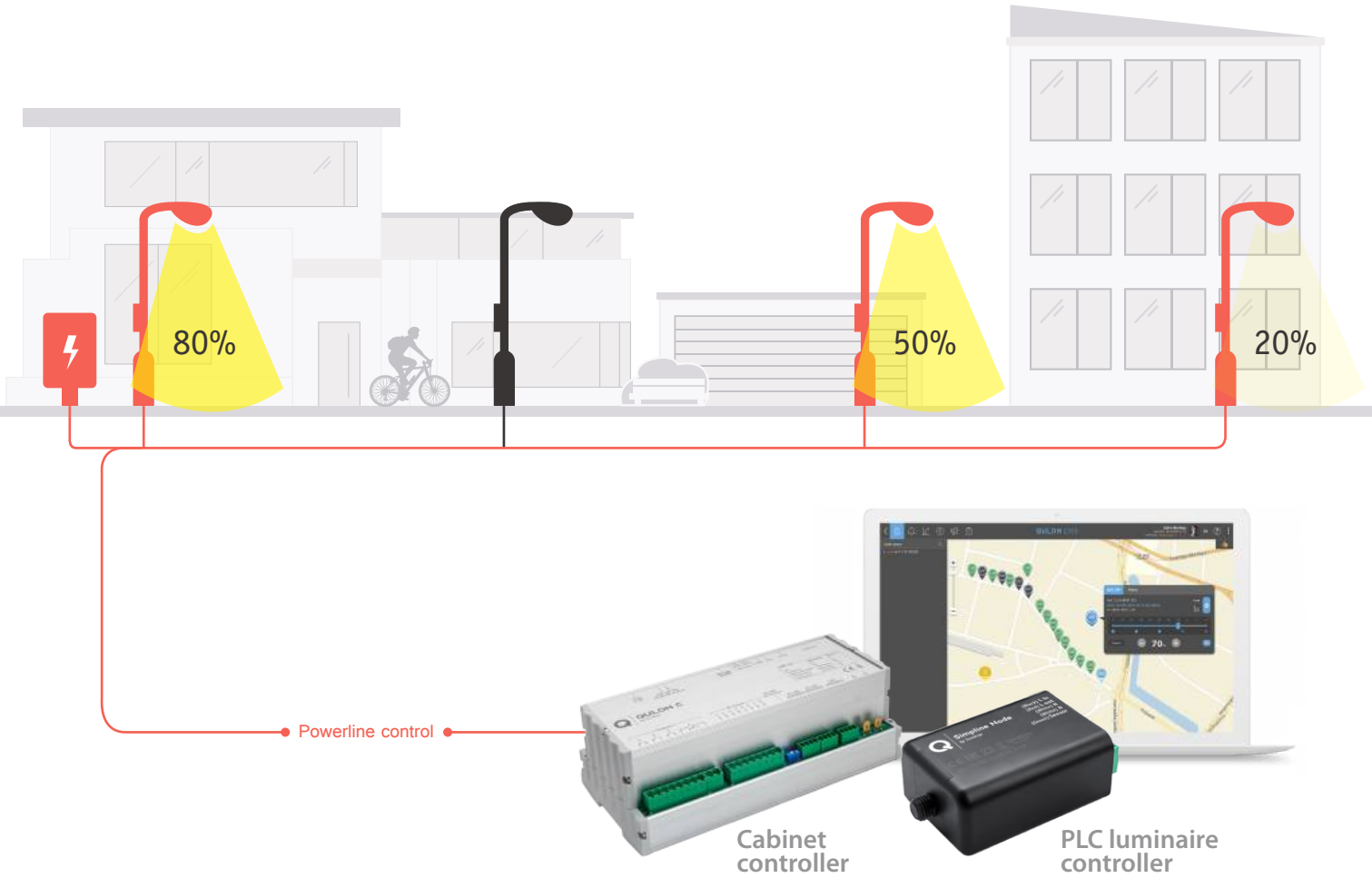


Events

# Power Line Solution

Individual lighting management through Simpline technology

- Level of Control ●●●●●●●●
- Energy Savings ●●●●●●●●
- Installation Speed ●●●●
- Operating Costs ●●●●●●●●
- Installation Costs ●●●●●●●●



**We recommend Simpline solution if:**

- Radio control is prohibited by state regulations
- Radio connection is hindered by some physical obstacles that cannot be avoided
- Street-light luminaire design forbids installation of 13 cm protruding antenna of radio module (decorative luminaires, hystoric significance)

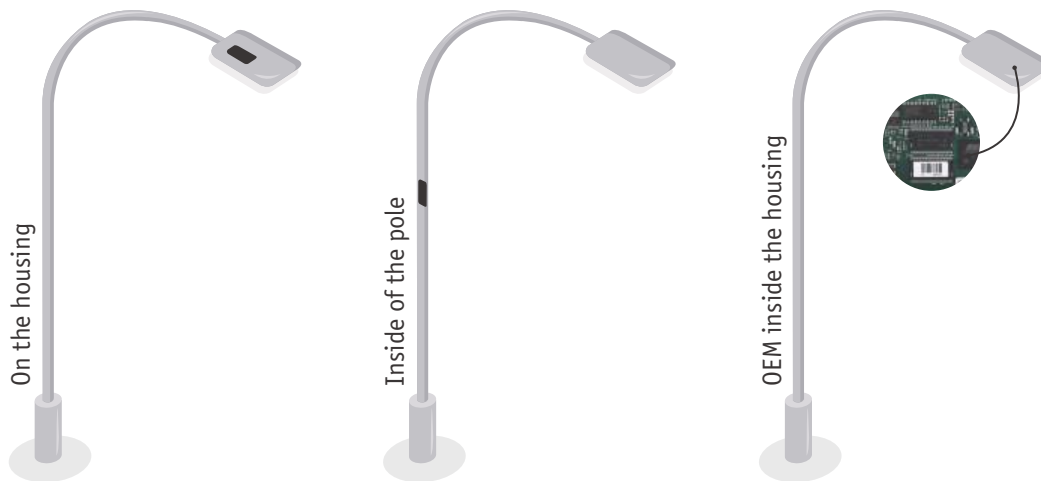




Simpline is a technology for remote control and status data transmission via 230V AC power lines developed by Sundrax . The Simpline system is a great platform for Smart City and Internet of Things applications, providing a stable communication with the different types of fixtures connected to the powerline that require permanent attention from the operator/supervisor. Simpline complies with European Standard CENELEC EN 50065-1, and uses narrow-band modulation in C-band. Each electric device connected to the power line is equipped with filtering inductances to avoid signal suppression. Simpline signal network is decoupled from the rest of the power distribution system using appropriate filtering inductances as well. Simpline provides half-duplex, “master-slave” communication between one central gateway (master) and a number of nodes (slaves).

Every node has unique number, which allows the gateway to address each one of them individually. The gateway also creates a network of nodes connected to the same power line by continuously polling nodes for their status and sending commands to an individual node, group of nodes or to the entire network. In case the power line used by a Simpline gateway control is too long or noisy, certain nodes may retransmit signal from the central gateway to distant nodes and back providing a stable communication across the entire network.

## 3 options for Simpline Node installation:



## Simpline Node

Technical characteristics — PLC control node

Housing — Solid plastic case, IP65

Dimensions — 80(D) x 57(H) x 35(W)mm

Weight — 0.3 kg

Operating temperature — -40...+70°C

Input Voltage — ~100-250 VAC, 50/60 Hz

Input Power (max) — 5W

Connectors — Leads, Screw terminals

Sensors — Motion sensor input

Control output interface — 1-10 V, DALI, PWM or Discrete output

Communication with controller — Simpline

Settings — Remote via Qulon Simpline

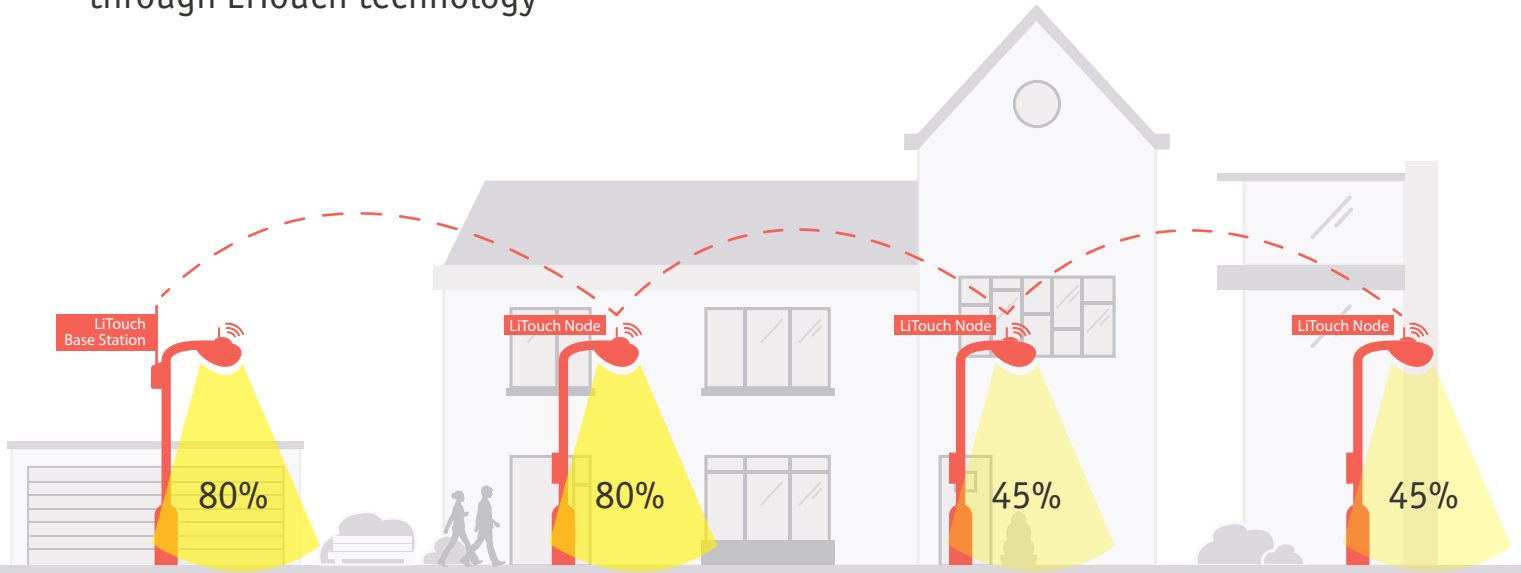
Mounting options — NEMA, Zhaga, Screw



# Wireless Solution

Individual lighting management through LiTouch technology

- Level of Control ●●●●●●●●
- Energy Savings ●●●●●●●●
- Installation Speed ●●●●
- Operating Costs ●●●●●●●●
- Installation Costs ●●●●●●●●



LiTouch base station provides individual wireless remote control of luminaires with installed LiTouch nodes. Base Station communicates as master to slave nodes using 800-950 MHz wireless interface. Base Station creates and controls a mesh network of up to 1000 LiTouch nodes in a range of up to 5 km, maximum distance depends on terrain and density of buildings. Base Station communicates with QULON software applications through GSM or Ethernet to control each luminaire remotely, monitor their status and power consumption.



## LiTouch Base Station

- Compact size, easy to deploy
- Operating Temperature: -40...+70°C
- Licence-exempt radio frequencies (ISM band 868/915 MHz)
- Configuration through GSM or Ethernet (Ethernet not available for Base Station Lite)
- Mounting: pole or wall
- Long-range communication (5 km)
- Output power 16 dBm
- Input voltage ~100-270 VAC, 50/60 Hz or 12-30VDC

GSM







LiTouch is a technology for remote control and status data transmission via 868/915 MHz narrow-band wireless channel developed by Sundrax. The LiTouch system is a great platform for Smart City and Internet of Things applications, providing a long-range, stable communication and data collection instrument. LiTouch takes advantage of low-speed 2-FSK modulation in 868 MHz band (for Europe), or 915 MHz band (for US). The exact operating frequency (channel) can be selected automatically or manually: Such flexibility provides enough space for several wireless networks to operate independently in the same area with no interferences or disruptions. LiTouch provides half-duplex, "master-slave" communication between one base station (master) and a number of nodes (slaves).

Every node has unique number, which allows the base station to address each one of them individually. The base station creates a network with nodes located in the same area (road, district, etc.), continuously polling nodes for their status and sending commands to an individual node, group of nodes or to the entire network. In case nodes are scattered over a large area that cannot be covered by the base station itself, certain nodes may retransmit the signal from the base station to distant nodes and back, providing a stable communication across the entire network.

## 5 options for LiTouch Node installation:



## LiTouch Node

Technical characteristics — Wireless control node  
 Housing — Solid plastic case, IP65  
 Dimensions — 88(D) x 190(H) x 88(W)mm  
 Weight — 0.3 kg  
 Operating Temperature — -40...+70°C  
 Input Voltage — ~100-250 VAC, 50/60 Hz  
 Input Power — 5W  
 Connectors — Leads, Screw terminals  
 Sensors — Motion sensor input, Embedded light sensor  
 Control output interface — 1-10 V, DALI, PWM or Discrete output  
 Communication with controller — LiTouch (ISM band 868/915MHz)  
 Settings — Remote via LiTouch Base Station  
 Mounting options — NEMA, Zhaga, Wire

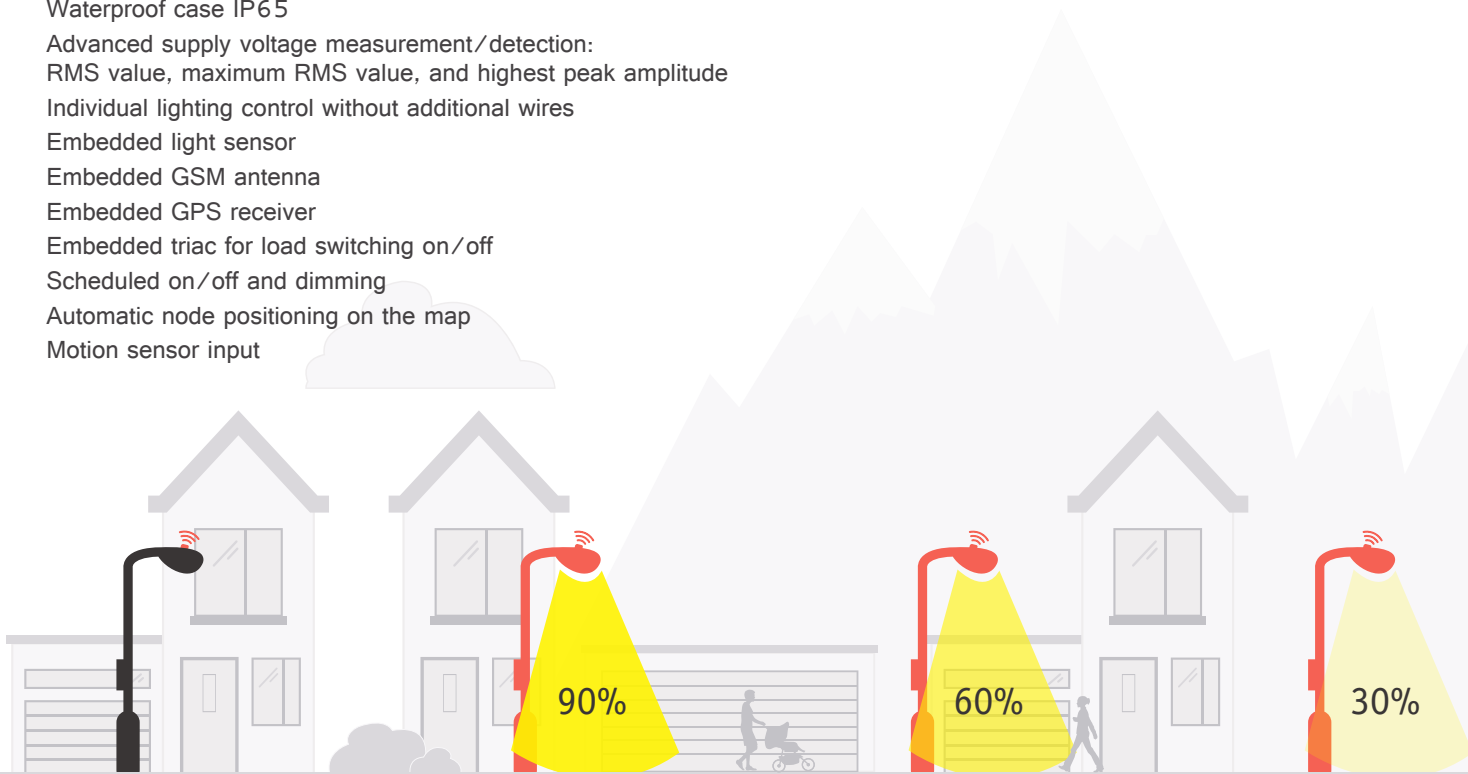


# GSM Solution

- Level of Control ●●●●●●●●●●
- Energy Savings ●●●●●●●●●●
- Installation Speed ●●●●
- Operating Costs ●●●●●●●●●●
- Installation Costs ●●●●●●●●●●

Control your lights individually and directly connect them to server and software through GSM

- Versions with open wires and NEMA plug
- RS-485 interface available
- Waterproof case IP65
- Advanced supply voltage measurement/detection: RMS value, maximum RMS value, and highest peak amplitude
- Individual lighting control without additional wires
- Embedded light sensor
- Embedded GSM antenna
- Embedded GPS receiver
- Embedded triac for load switching on/off
- Scheduled on/off and dimming
- Automatic node positioning on the map
- Motion sensor input



GSM luminaire controller



LoRaWAN - wireless lighting control technology based on the LoRaWAN network protocol with low power consumption and a range of up to 20 km. Also provides wireless connectivity to a variety of battery-powered IoT sensors.



# Just install and control it

**Simple**  
plug-and-play  
street lighting control



## Instant Activation

Nodes are equipped with GPS to locate themselves on the map automatically. Once the location is identified, each node instantly connects to the QULON server using the existing GSM network to send status data and receive commands.

## Universally Compatible

Complete with NEMA compatible plugs or leads, each node can be installed on any existing or new lighting fixture, with no limit of model or manufacturer.

# Helios

GSM controller for standalone solar powered lighting installations

Battery rated voltage 12/24V  
 Max open circuit voltage 100V  
 Max charge current 12A  
 Max power 180W (12V) / 360W (24V)  
 Max load current 5A  
 Own consumption 20mA



HELIOS is the new generation of controllers for solar-powered lighting. It provides both charging control and remote monitoring of your standalone lighting systems in real time. Scheduling, live control, live battery status, full information about lighting performance onsite. Amongst other functions, it provides additional safety for pedestrian crossings, bus stops and traffic lights systems by ensuring their correct functioning at all times.

## Key Features

- MPPT charge technology (efficiency 97%)
- Optimized 3-step process of the battery charge (bulk charge, absorption charge, float charge)
- Automatic detection of the nominal system voltage (12V/24V)
- Supports three types of batteries (GEL, AGM, Flooded)
- Remote management and configuration via GPRS / SMS
- Integrated LED driver
- Control and monitoring of current supplied to the lamp
- Schedule of events for light control
- Electronic protection against over-load current





# Live Control for Architectural Lighting



Public  
Festive Lighting



Historical  
Landmarks



Flags,  
Monuments

## Same Control Tools. Single Software.

The QULON portfolio of solutions includes MONARQ, a tool for live control and diagnostics of architectural lighting installations from the same street lighting control software suite. Check status of your assets remotely, straight on the map. Select scenarios, program, schedule and switch scenes in real-time.

## Simple and Efficient Monitoring

Now you will be always aware of power consumption and performances of your architectural lighting installations. Schedule daily/weekly/monthly performance reports to send via email and receive alarm notifications via text message each time an event is triggered or threshold is crossed.



# QULON CMS

## Flexible

Due to the modular structure of the equipment, our system can be easily upgraded by adding new modules. Such structure helps to plan your future expenditures consciously, heading to smarter city technologies step by step.

## Direct

The System directly controls or dims individual lamps, phases, or groups of lamps to prevent over-lighting or under-lighting of given areas.

## Future-proof

Our radio, GSM, and powerline control nodes fit into any conventional lamp with electronic ballast, as well as into any LED using a DALI, 1-10V or PWM interface and CENELEC C for PLC solution.

## Efficient

System operators can easily interact with the lighting control system, monitor live data from the lamps and perform on/off and dimming operations for lamps and entire groups of lamps.

## Handy

The QULON System allows constant remote controlling of energy-usage parameters, including power, voltage, current, temperature and actual runtime or work time of luminaires.

Fast connection  
Accurate reports  
Easy installation  
Remote management

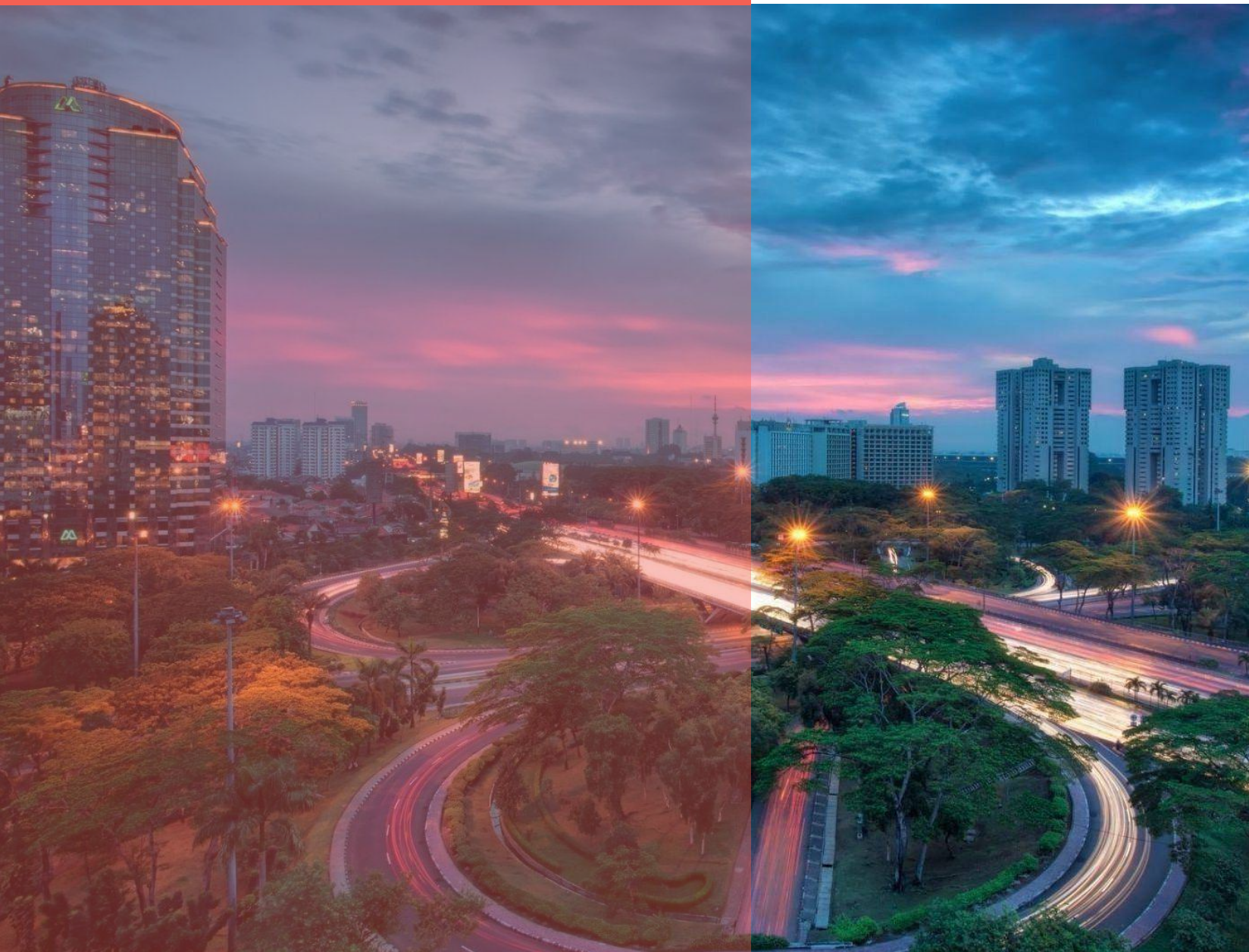


# Different Lights, Unique Solution

QULON CMS was implemented within the centre of Jakarta, Indonesia. Over 4,500 lights LED and HPS lights are switched and dimmed via Powerline control according to custom saving scenarios. An accurate deployment plan and special filtering algorithm made it possible to combine both controlled and uncontrolled lights within a single power line. Old HPS lamps in the side streets are controlled individually together with dimmable LEDs in central avenues.

Any occurring failures are immediately reported to the control room and emailed to operators resulting in 90% faster response to lamp malfunctions. Implementation of CMS saved from 30% to 60% in different areas depending on the type of luminaires and applied saving scheme.

 Jakarta, Indonesia

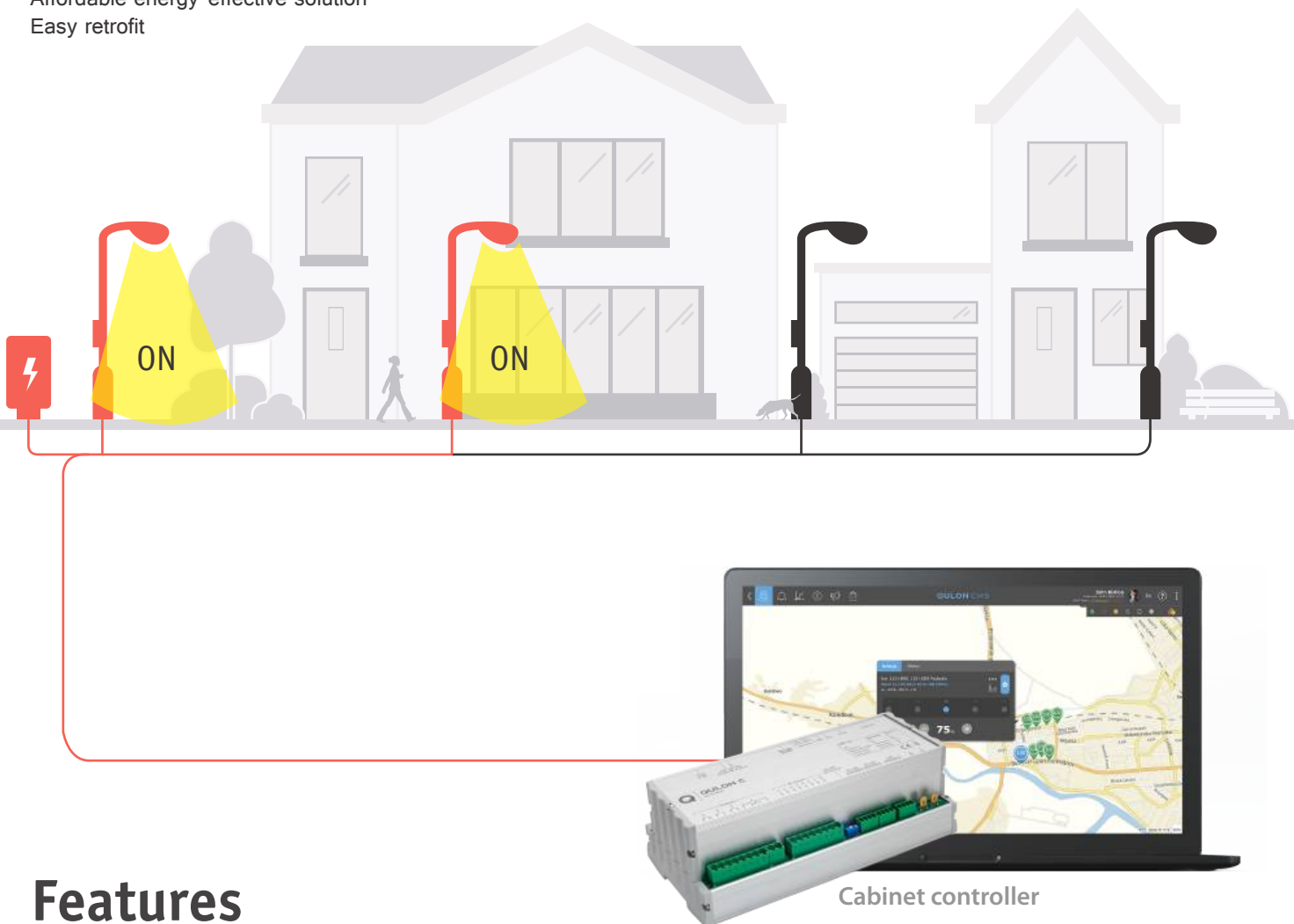


# Group Control

Level of Control	● ● ● ●
Energy Savings	● ● ● ●
Installation Speed	● ● ● ● ● ● ● ●
Operating Costs	● ●
Installation Costs	● ●

Easy and affordable way to connect your luminaires into a single system

Fast payback  
 Easy upgrade  
 Low installation and maintenance costs  
 Affordable energy-effective solution  
 Easy retrofit



## Features

On/off scheduling  
 Independent control of each phase  
 Data collection from electric meter: current, power factor, cumulative power (kWh/kVAh), active and apparent power, voltages, current and voltage per each phase etc.  
 Identification of electrical faults  
 GPS and astronomical clock onboard

### Cabinet controller

105 x 210 x 75mm  
 DIN-rail mount in the power cabinet  
 4 relay outputs  
 6 checkpoint inputs  
 2 dry contact inputs  
 Working conditions: 100-250V, -40° to +60°C  
 Remote control over GSM 1800/ 850/ 1900  
 GSM/GPRS/EDGE or GSM/GPRS/3G  
 Built-in non-volatile clock  
 RS-485 interface



# Reliable and Affordable

A city-wide group control solution  
for developing urban communities

 Agartala, India

35,000+ lights are controlled by Sundrax's QULON street lighting Central Management System in order to bring efficiency, economy, and better illumination in street lighting sector of Agartala City. The project has been completed in collaboration with Energy Efficiency Services Limited (EESL). Old HPSV and CFL street lights have been converted to LEDs and then networked with our QULON CMS as part of the jointly elaborated street lighting management program.

The Group Control solution has been chosen for a faster, city-wide control system implementation. Sundrax developed the deployment plan and installed over 700 control modules into power cabinets around Agartala to switch luminaire groups on and off according to the set scenario. QULON CMS provided analytic tools to evaluate power consumption and performances of the lighting infrastructure, as well as allowing a prompt response to lamp failures and power shortages around the city. Relay control has been proven as the most affordable and easily implemented solution to take command of the lighting in rapidly developing urban communities.

The Group Control solution is easily upgradable at a second stage of street lighting development into an even smarter individual control system simply by adding powerline or radio control modules to the existing QULON controllers. QULON CMS is saving in Agartala over 450,000 USD per year by proper lighting management and maintenance savings.

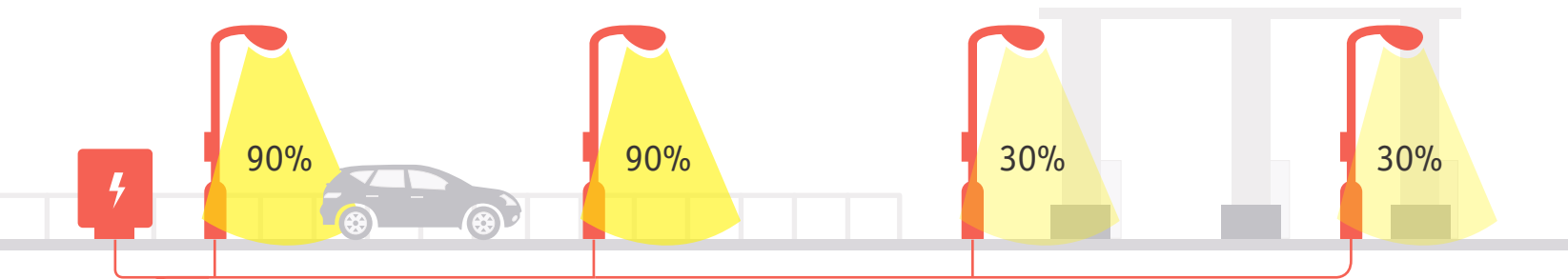


# Group Control + Dimming

- Level of Control ●●●●●
- Energy Savings ●●●●●
- Installation Speed ●●●●●●●
- Operating Costs ●●●
- Installation Costs ●●●●●

### Street lighting management optimization and energy savings for traditional lighting system

- On/off scheduling
- Independent dimming of each phase
- Powerline voltage stabilization
- Data collection from electric meter
- Increases lamp burning hours
- Easy retrofit



## Phase dimming

The additional dimming module QULON-D is a smart supplement that stabilizes and controls voltage in three-phase networks with conventional lamps. By providing phase dimming in 180-245V range for 230V networks, QULON-D saves you up to 40% of energy costs and prolongs bulb lifetime through "soft start" technology.

This dimming module provides a wide range of diagnostic tools for output power lines as well as incorporating overload protection and short circuit resistance including built-in bypass for emergencies.

**40% energy savings**  
only by phase dimming





# Dimmer

QULON-D is smart supplement decision to stabilize and control voltage in three-phase networks with conventional lamps. Only by providing phase dimming in 170-235V range for 220V networks QULON-D saves up to 40% of energy costs and prolongs bulb lifetime (through "soft start").



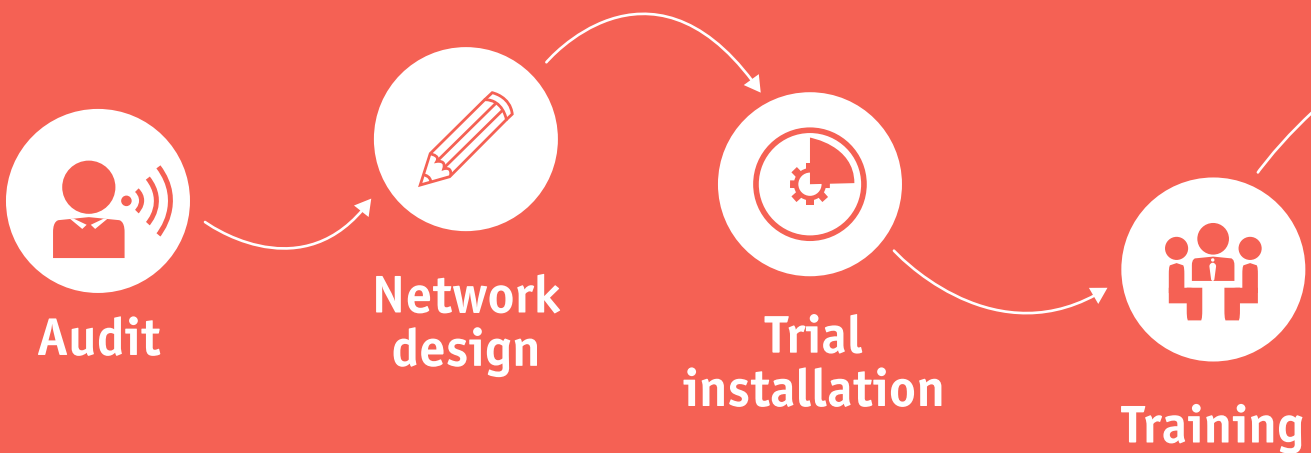
Dimensions, mm: 1200(H) x 800(W) x 280(D)  
 IP Rating: IP 54  
 Operating Temperature: -40...+70°C  
 Mounting: On pole or wall  
 Connectors: Terminal blocks  
 Input Voltage: Three-phase AC 230 V, 50 Hz  
 Controllable output lines: 3 phases  
 Max voltage at inputs: 265 V  
 Adjustment range at rated voltage of 230V: 180-245 V or 185-230 V  
 Adjustment step: 5 V  
 Maximum load power: 9, 15, 24, 45, 60 kW  
 Serial interface: RS-485 (MODBUS RTU)  
 Setup: remote via QULON Software, buttons onboard

## Skopje Macedonia

29 primary road interchanges scattered around capital  
 2,453 lights networked as a single dimmable country-wide system  
 Solishte Tunnel lighting control  
 Seasonal fluctuations in savings from 25 to 40%



# Step



Professional assessment of existing lighting infrastructure is one of the key elements for a successful lighting management and should not be underestimated.

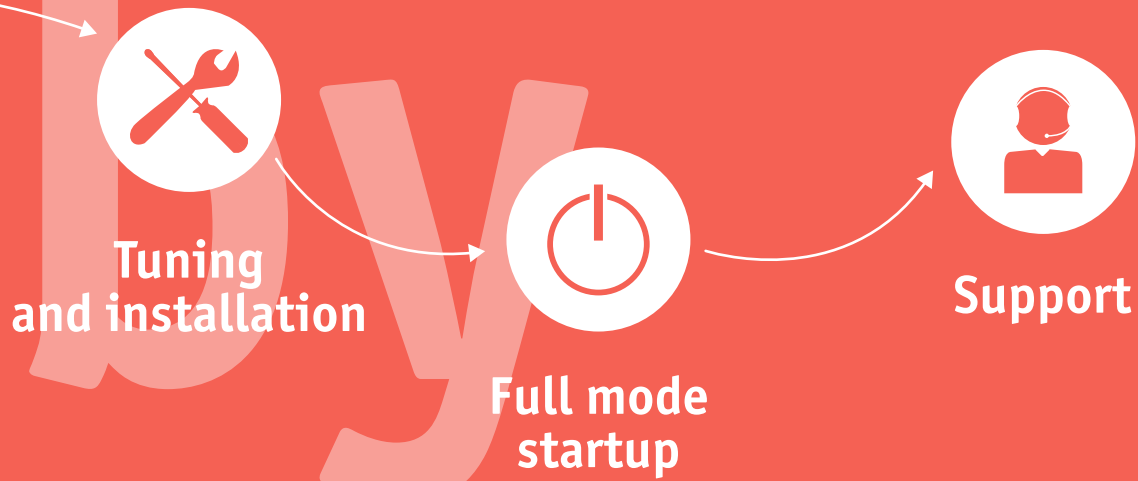
At the stage of network design we select the optimal technology (wireless, GSM, or PLC) and create a deployment plan to provide full coverage of the street lights network using the minimum possible number of gateways considering the location topography and urban layout.

Before investing time and resources on a full installation, Sundrax specialists choose a small area to test the designed system. This approach gives us the opportunity to optimize the system and update it according to the results of the tests.

Although the QULON system is designed to be operated without any special skills, Sundrax has developed specific training programs and provides instructions and guidelines based on the customer's needs.



Step-by-step project implementation programme that helps us to provide our customers with precise turn-key solutions



Based on the results of these tests, Sundrax can customize each solution to ensure flawless results for the installed street light management system.

Commissioning of the full version of street light management system that perfectly matches customer's needs.

QULON provides free of charge **full 3-Year performance warranty** and 24/7 customer support.

# Step

To learn more about Sundrax's energysaving intelligent lighting management systems and to order free demo installation, call +44 (0)20 3868 9976 or visit [streetlighting.sundrax.com](http://streetlighting.sundrax.com)

# Why QULON

## 5 Advantages of Our System

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### Scalability

Challenged by widely diverse demands of our customers, we managed to design the most flexible solution in the world. QULON Systems are professionally tailored for any kinds of lights and budgets. Simply add or remove existing modules to create a kit that is perfect for your lighting management needs. Upgrade your system and step up along with the growing requirements to build a smart city at any time simply by installing additional modules. This is simple yet very powerful. Our high precise, SCADA compatible modules may provide control through any existing communication channel including radio channel, GSM, 3G/GPRS, Ethernet, as well as through existing Powerlines (PLC), or even scheduled autonomously in case there is no connection to remote areas. We designed QULON Systems on open standards which make them compatible with other big data management systems of your smart city, including architectural lighting.

### Reliability

Our strict Quality Control Procedures provide extreme performance and reliability for the fail-proof control of any luminaire type. We keep all stages of production under strict control as every module is designed and manufactured by Sundrax exclusively. We equip our QULON modules with short-circuit resistance and over-voltage protection up to 315 V; all of them are tried, time-tested, and currently installed in severe weather conditions from the hottest deserts of Central Asia to extremely low temperatures of Russian Polar Regions. That is provide you with full 3-year warranty technical support for our products.



### Seamless integration

QULON systems are easily integrated into existing lighting infrastructure. No need to change your lamps or poles to experience the highest control functionality of QULON systems as modules are installed straight into power cabinet as plug-and-play devices without special skills or additional wiring. Apparently, such technology allows substantial reducing of maintenance costs and provides people with comfort and attractive lighting while keeping the same design of your luminaires and facilities. QULON System Software includes integrated architectural lighting controls providing perfect solution for smart monitoring and management of all city lighting facilities from a single system.





## Energy efficiency

Use our latest innovative technologies to considerably reduce energy consumption, thus cutting CO<sub>2</sub> emissions to enhance green image of your smart cities. We apply motion sensors, dimming, soft-start, and other dynamic lighting features to achieve energy savings of up to 70% only by proper lighting management comparing to old conventional lamps. We do not keep your savings virtual: integrated software provide detailed real time reports of both energy and financial savings at no additional cost. Such real time monitoring also allows reporting of condition and failures of any lamp in any exact location, which offers the opportunity of significant reduction of ongoing maintenance costs through prolonged bulb life. Sundrax's approach helps you to manage your lighting systems responsibly and in energy-effective way.

## Wide functionality

Wide internal functionality with extensive report features and auxiliary sensors provide unbelievable control of your lighting systems collecting various parameters of the network such as current, voltage, energy consumption, phase shifts, current frequency, power factor and many more. Light level scheduling, motion sensors, lamp burnout detection, real-time financial savings reports in your currency, weather and traffic data, temperature sensors enable lighting management in the most effective way.

# Intelligent Tunnel Lighting

Specific control solutions for a safer and more comfortable tunnel lighting adjustment



## Luminance Sensor

Hi-res photo camera  
with luminance meter and night view mode

## Keeping it visible

Intelligent adjustment of the luminance level is very important in tunnel access and exit zones to guarantee a correct visual perception of drivers at any time of the day or night. The luminance meter integrated into QULON Photo visual module allows the system to adjust automatically the intensity of tunnel lighting, based on the measured intensity of natural light.

### Daytime Lighting Management

The luminance meter sends information about measured intensity of natural light to the software, that increases lighting intensity in the access zone of the tunnel in the daytime, helping drivers' eyes to adapt and avoid the so-called black hole effect. Moderate dimming is present in the central portion of the tunnel while in the exit zone luminance is again increased for smoother visual adaptation.

### Night-Time Lighting Management

At night, the lighting level inside the tunnel is kept in full accordance with the one on the road outside, to avoid blind spots and guarantee an optimal perception of any obstacles in any part of the tunnel access/exit zones for the drivers.



# Adaptive Lighting

Road lighting management based on traffic volume and weather conditions

## QULON Traffic

Traffic intensity sensor

Traffic-based lighting management is a smart solution for roads with highly fluctuating traffic volumes. Lighting intensity is modified based on the hourly statistics collected by QULON Traffic to ease the strain on the environment and city budget. In addition, QULON Traffic is useful to collect traffic stats at the pre-design stage for planned changes in lighting infrastructure.



## Meteo Sensor

Modbus-RTU Temperature, humidity and atmospheric pressure sensors

Adverse weather conditions usually require higher level of lighting intensity to increase security, safe conditions on the roads and public well-being. QULON Meteo provides city operators with live weather information for better lighting adjustment to the environment.



## IR Temperature Sensor

Modbus-RTU Infrared temperature sensors

Provides remote monitoring of road temperature, directly sends information to QULON CMS and other telemanagement systems. Easy pole mounting installation.

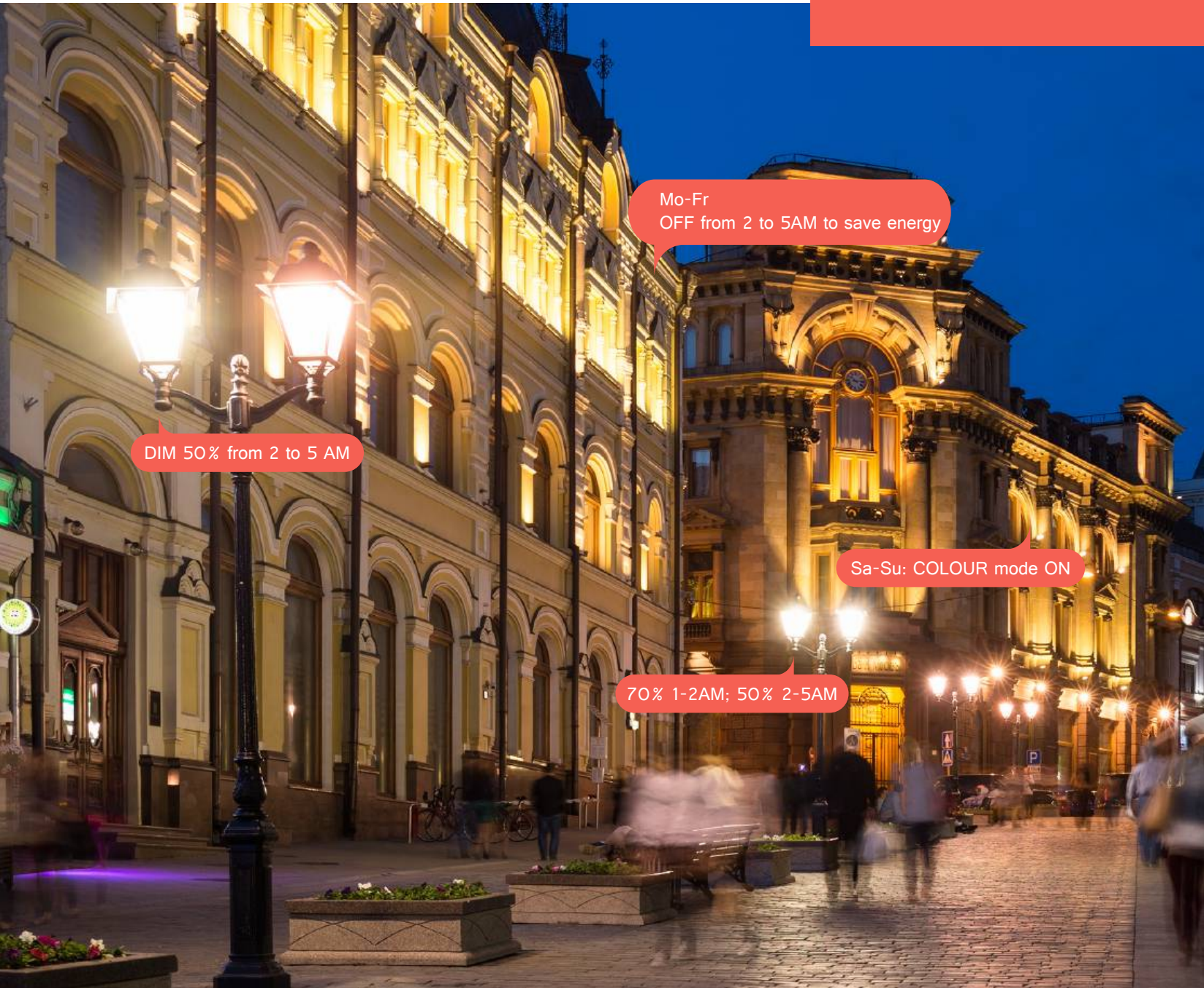




# Choose **the Smartest**

Sundrax is always open for cooperation and partnership. We offer various packages for municipalities, electrical contractors, LED manufacturers, service and maintenance operators. Let us be the partner you can rely on to help you create tomorrow's state-of-the-art street and road networks.

Sign up for a free demo installation or send enquiries to:  
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Mo-Fr  
OFF from 2 to 5AM to save energy

DIM 50% from 2 to 5 AM

Sa-Su: COLOUR mode ON

70% 1-2AM; 50% 2-5AM



# Providing the world with smart systems for over 14 years



Sundrax is a pioneering developer and manufacturer of hardware and software for lighting control. The company's mission is to design innovative, turn-key, fully integrated solutions for almost every single area of the lighting industry: Whatever your requirements are, we can provide you with reliable and project-oriented products for road & street, architectural, and stage lighting management. Working in the field of lighting control solutions for more than 14 years, Sundrax has grown to become an industry leading developer and internationally recognized company with Head Office in London, UK.

This catalogue is dedicated to the QULON System — our affordably priced yet incredibly advanced and reliable road and street lighting management system, unmatched in terms of scalability and flexibility and supported by a first-class customer service worldwide. Proceed to the next pages to find out how we can create together a brighter and sustainable future.

# QULON

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