

# Smart City

OLE SCCS (Smart Lighting Control Cloud-based System)  
Opens to various applications of smart city

Smart Grid



Smart Agriculture



Internet of Things



Smart Retail



Smart Health



Smart Transportation



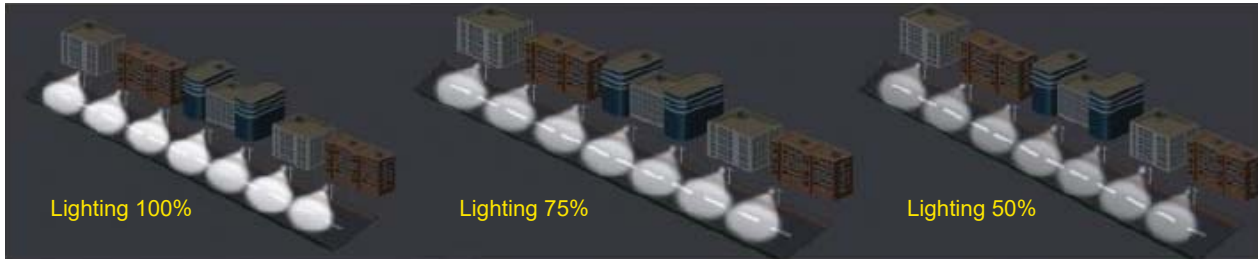
Smart Home



Education



# Energy Saving Analysis



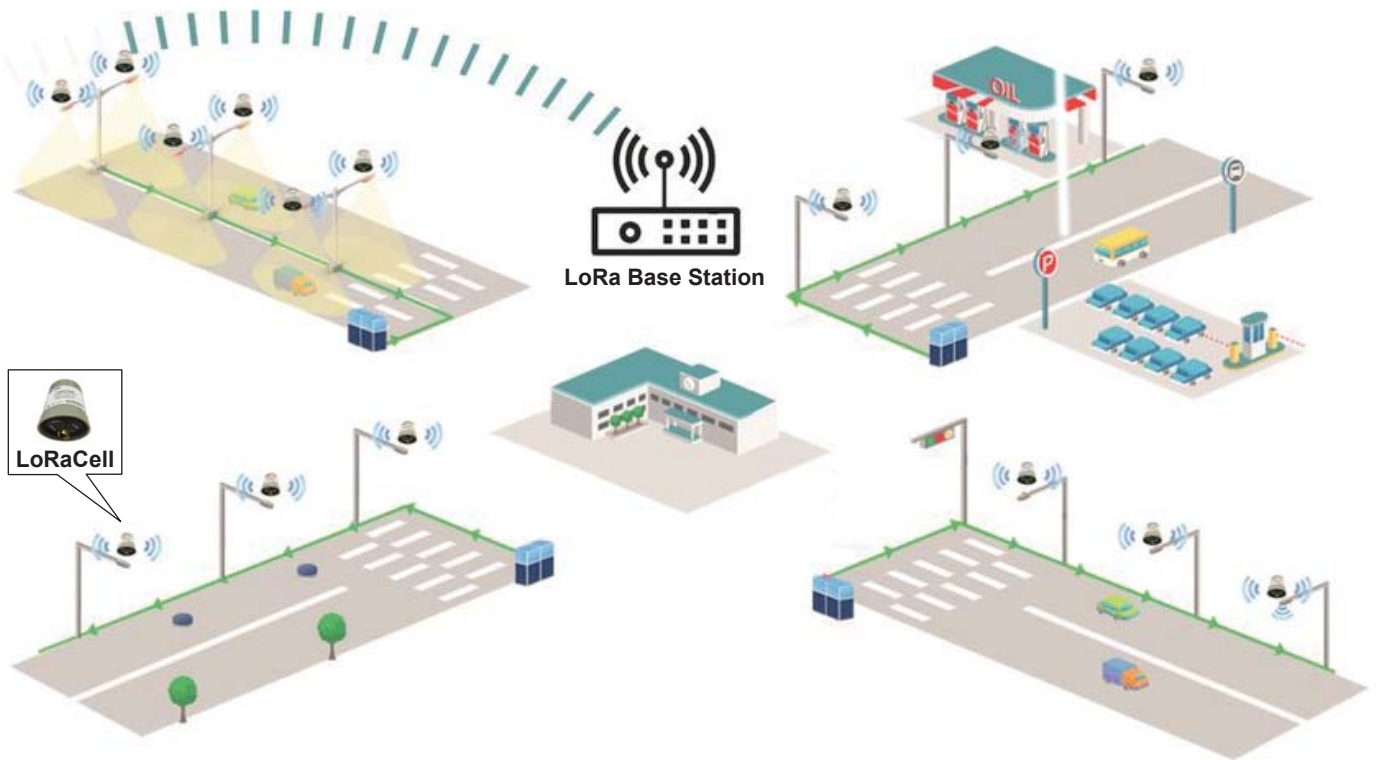
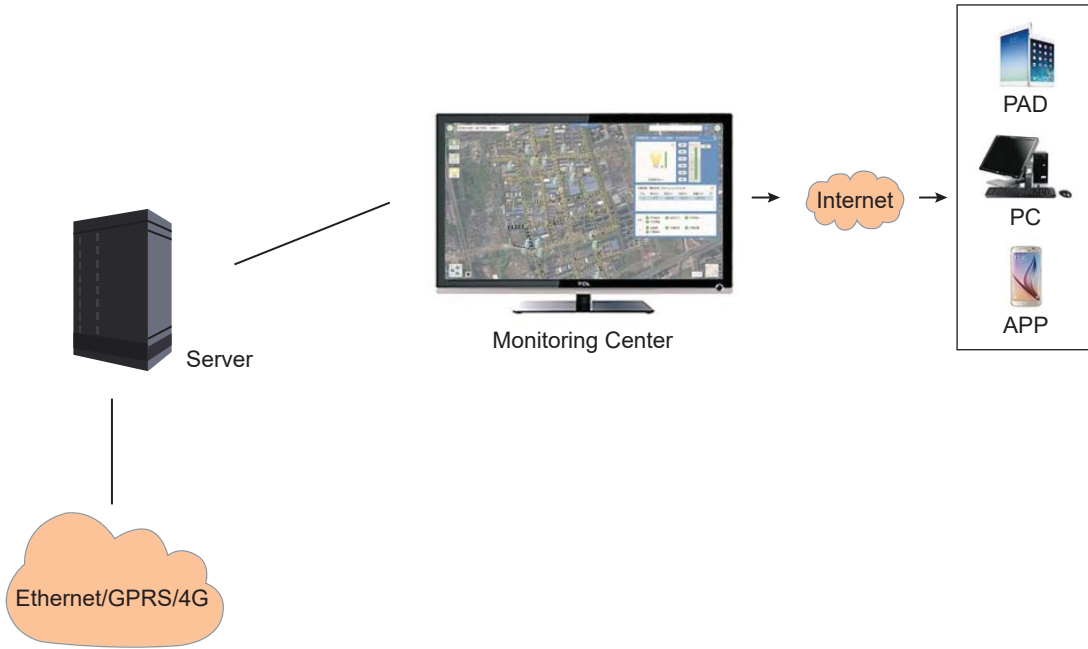
Comparison		250W HPSV Street Lights					150W LED Street Lights				
		Qty	Power (W)	Operation Hours/Day	TNB Tariff (RM)	Day/Year	Qty	Power (W)	Operation Hours/Day	TNB Tariff (RM)	Day/Year
		10,000	275	12	0.192	365	10,000	150	12	0.192	365
Energy Consumption Statistics	Daily Power Consumption	33,000 kWh					18,000 kWh				
	Annual Power Consumption	12,045,000 kWh					6,570,000 kWh				
	Daily Electricity Fee	RM 6,336.00					RM 3,456.00				
	Monthly Electricity Fee	RM 196,416.00					RM 107,136.00				
	Annual Electricity Fee	RM 2,312,640.00					RM 1,261,440.00				
Energy Saving Rate		45%									
<b>150W LED Street Light with Smart Lighting Control System</b>											
Energy Saving Mode		Dimmable Energy Saving									
Energy Saving Strategy		First 6 Hours Operate At 100% Energy & Another 6 Hours (Off Peak Hours) Operate At 50% Energy Due To Dimming Operation									
Energy Saving Rate		25%									
Total Energy Saving Rate						59.09%					
Annual Electric Charge After Replacement						RM 946,080.00					
The Actual Energy Saving Data Subject to the Real Time Operation											



## Solutions

### Street Lighting

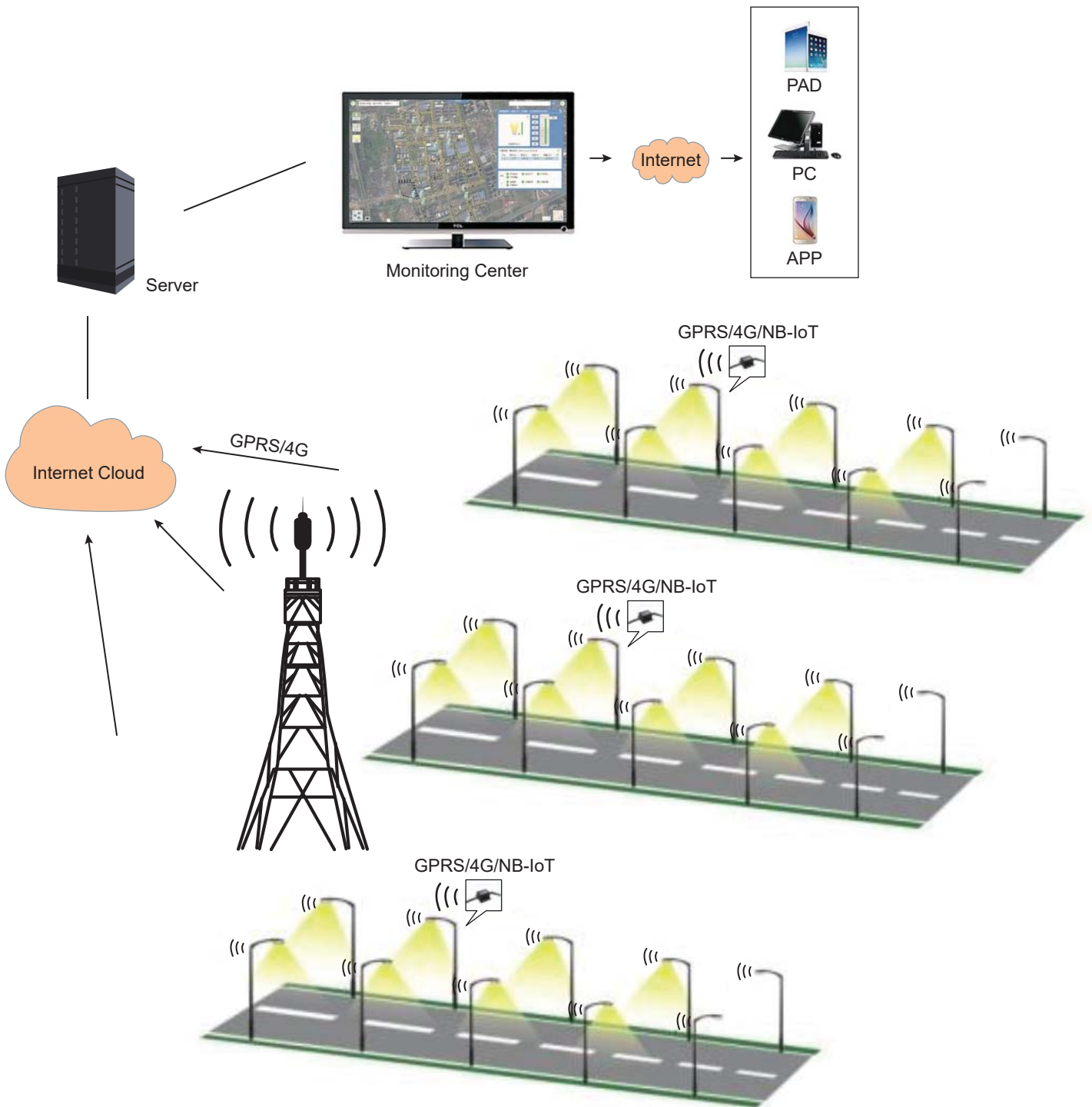
- LoRa



## Solutions

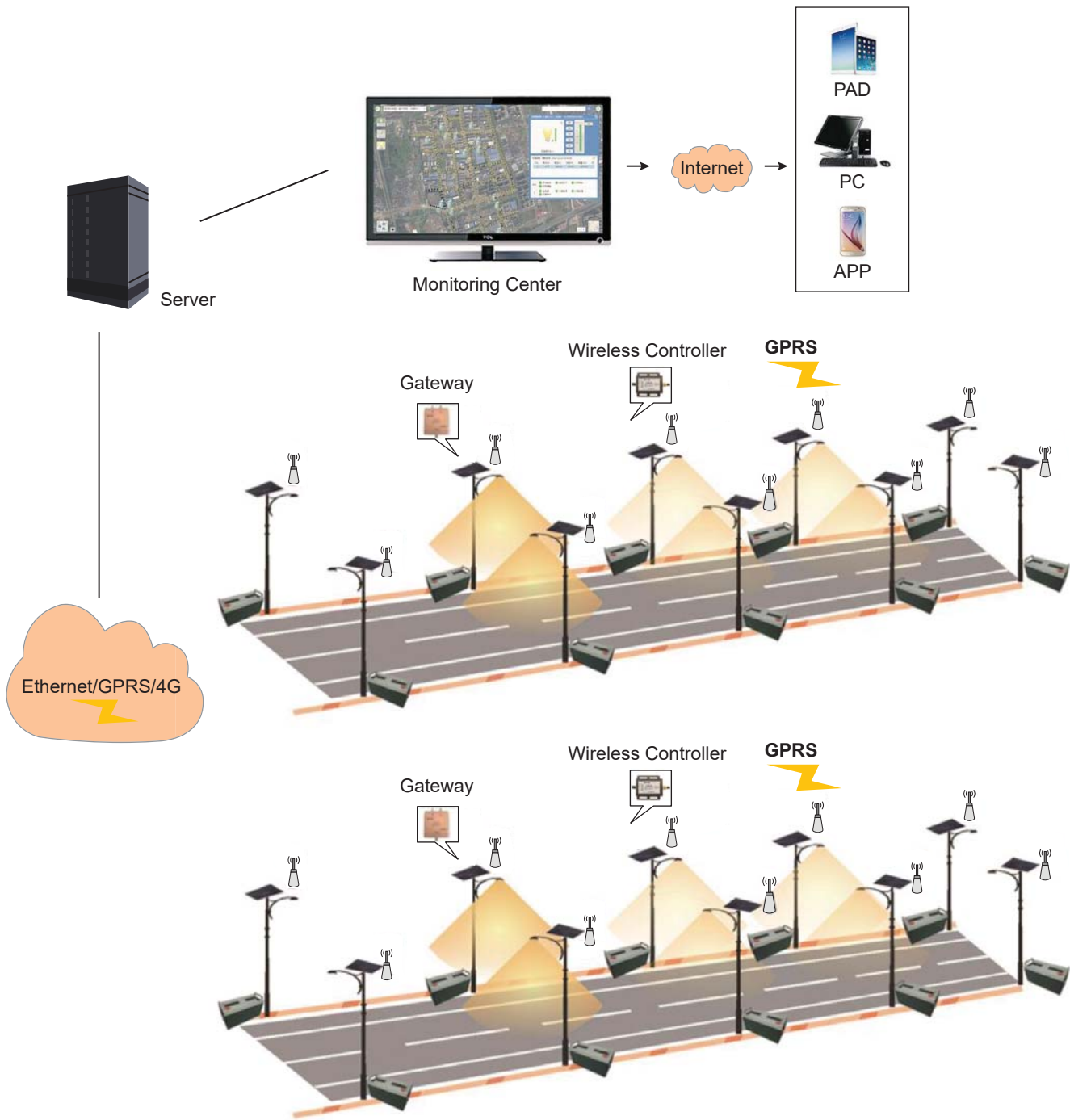
### Street Lighting

- GPRS/4G/NB-IoT



## Solutions

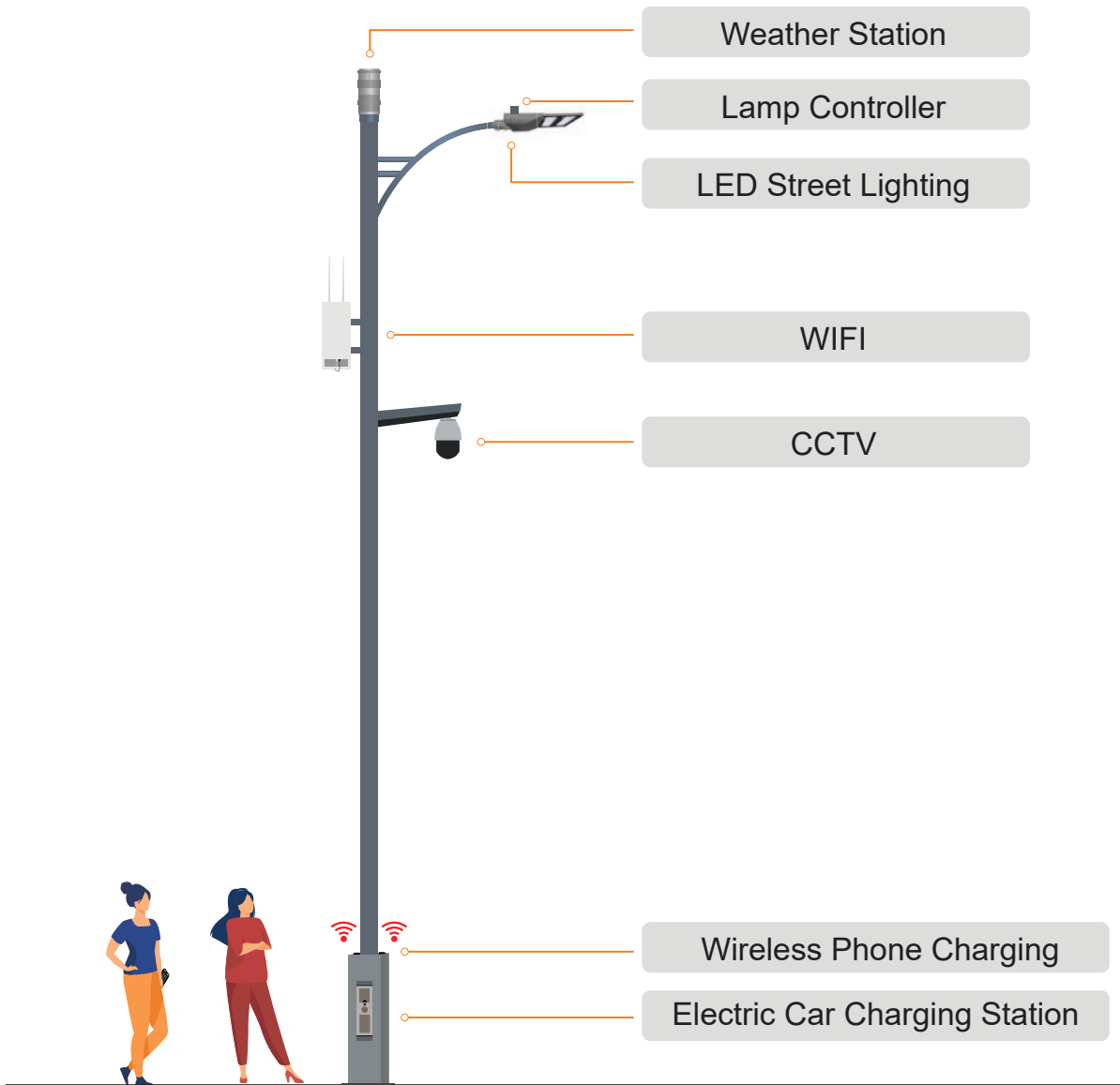
### Solar LED Lighting







## Smart LED Street Light Pole





# Smart Lighting Solution



Simple, high-efficiency central management



Flexible and intelligent light control



LED lamp with long operating life



Solar powered



Conspicuous outdoor LED display



Precise monitoring of air quality



Unified multiple service access gateway



High speed public wireless broadband service



HD video surveillance



One-button enabled emergency call



Versatile public broadcast



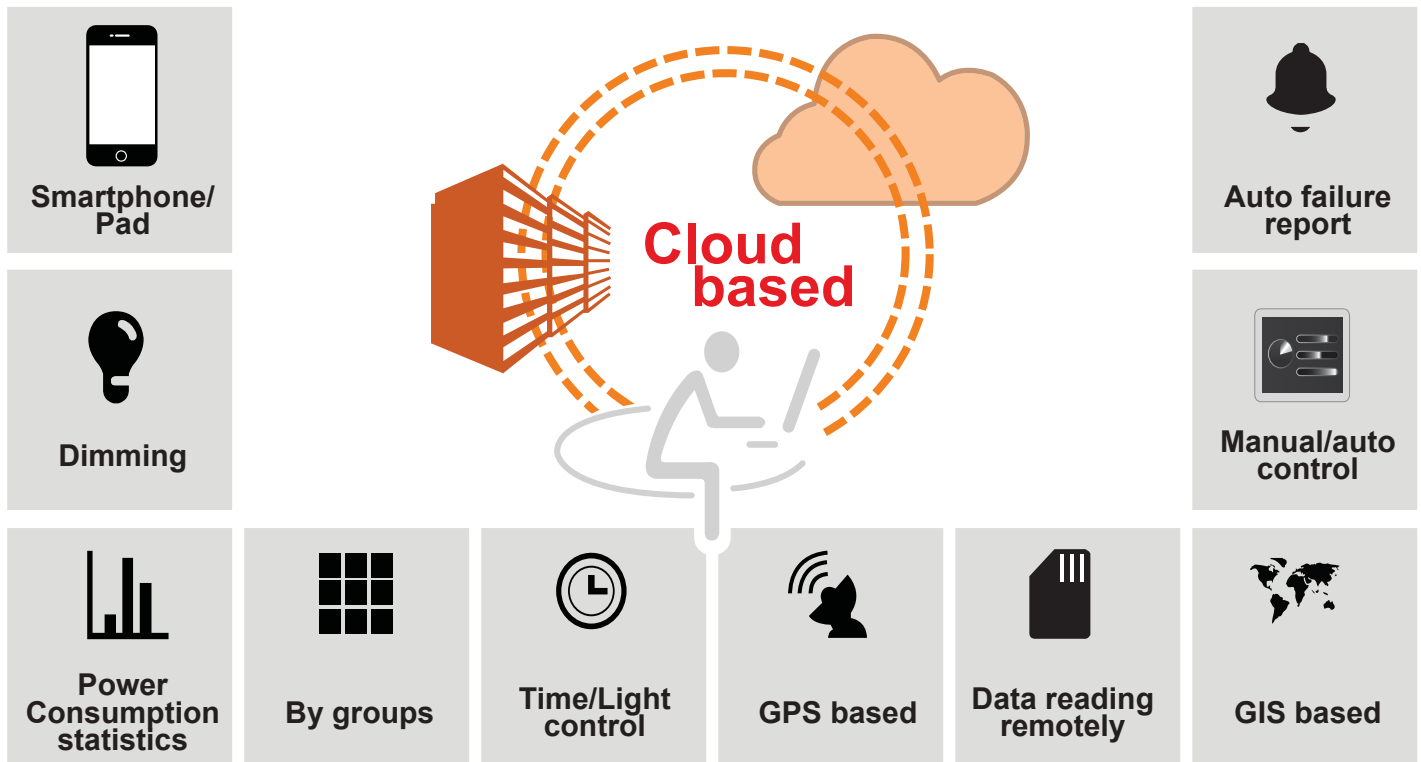
Real-time traffic statistics



# SCCS

## Smart Lighting Control Cloud-based System

- Elegant design
- Cloud-based system
- Convenient management entry
- Support multiple communication protocols
- Easy to integrate with third party system
- Keep the entire street lighting system in view
- Distributed deployment, extendible RTU space



# SCCS

## Smart Lighting Control Cloud-based System

Smart Lighting Control Cloud-based System (SCCS) is a web-based solution with advanced communication and easy integration with existing installations, can monitor individual luminaires up to millions of points of light. It facilitates reduction in power consumption, CO<sub>2</sub> emission, light pollution and moreover an optimized maintenance planning.

### ● The system features

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- Fault alarms
- Easy installation
- Lamp and line status
- Power quality metering
- Remote monitoring (turn on/off, dimming, data query, etc)

### ● Energy and cost saving result from:

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- Dimming at off-peak traffic hours
- Reduced maintenance costs
- Burn hour optimization
- Accurate switch ON/OFF

### ● CO<sub>2</sub> reductions

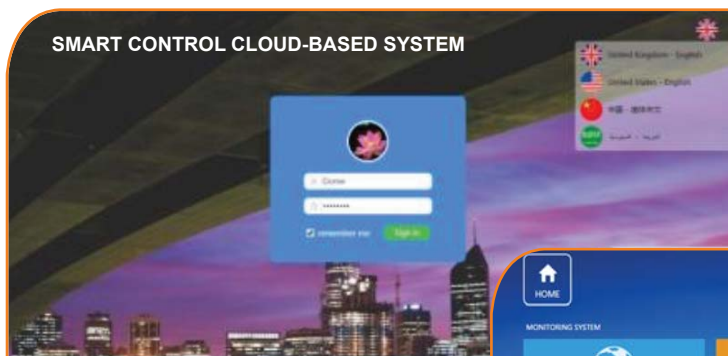
Reducing the costs and CO<sub>2</sub> emissions of streetlights is a necessary challenge for most utilities and distribution companies who face:

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- Rapidly increased electricity costs
- CO<sub>2</sub> reduction requirements
- Growing electricity demands

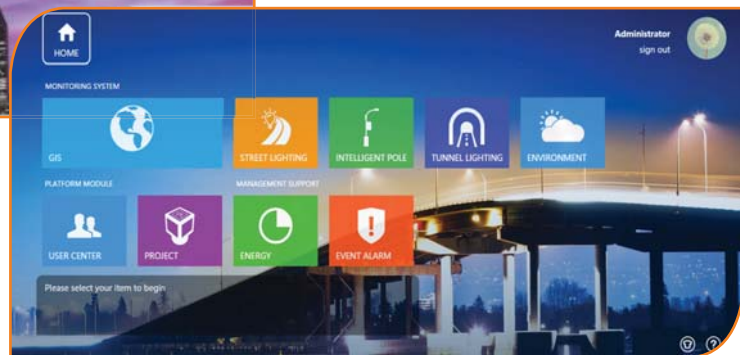
# SCCS

- User friendly interface



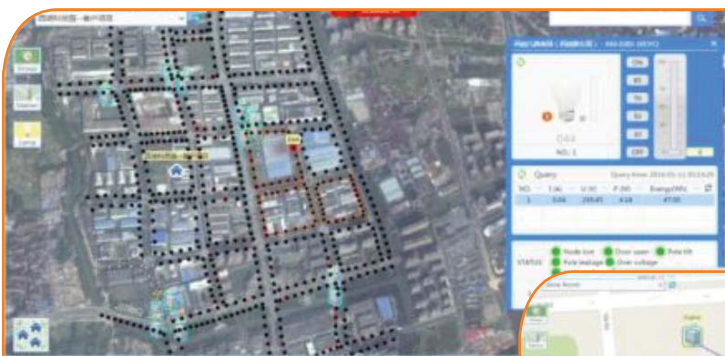
## SCCS

Smart Lighting Control Cloud-based System of city lighting

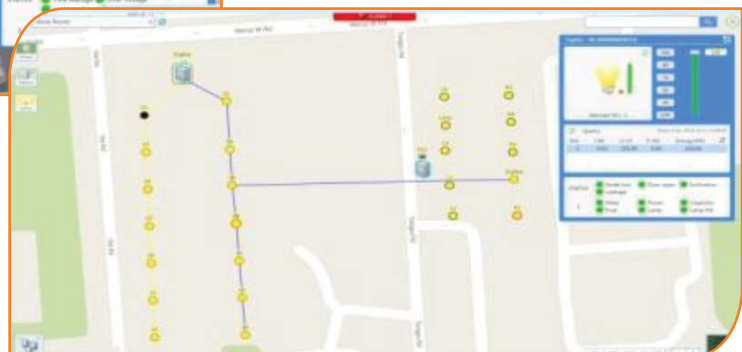


- Convenient management entry
- Multilingual choices
- Elegant design

- Geographic information system



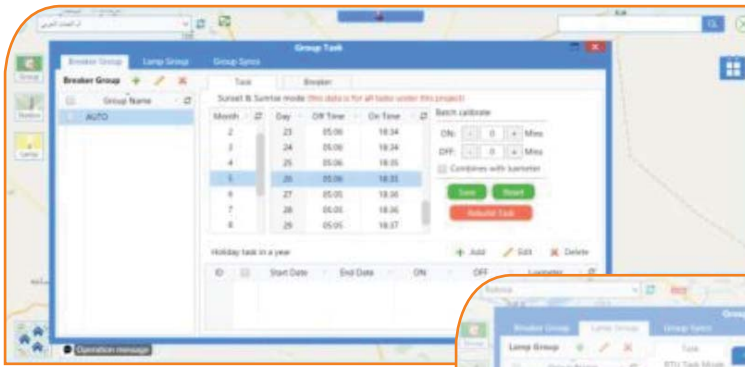
- Based on the GIS system design
- 2D/3D map
- Batch lamp control operation
- Lines & branches marked



- Real-time alarm warning
- Quick positioning and facilities maintenance
- Equipment partition management
- Batch deployment capabilities

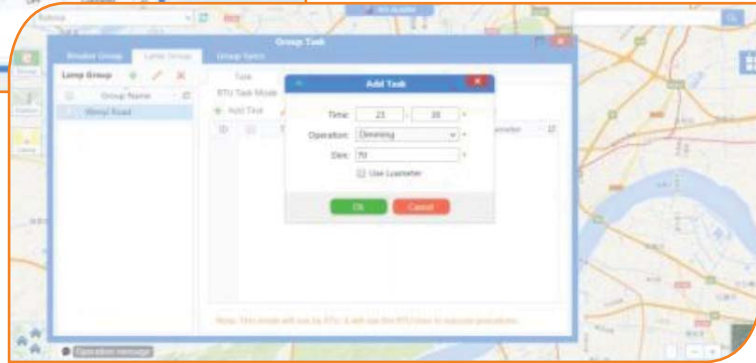
## SCCS

### ● Task strategy



- Rapid deployment
- Tasks strategies
- Light sensor control
- Offline tasks
- Fast synchronization

Customized task strategy

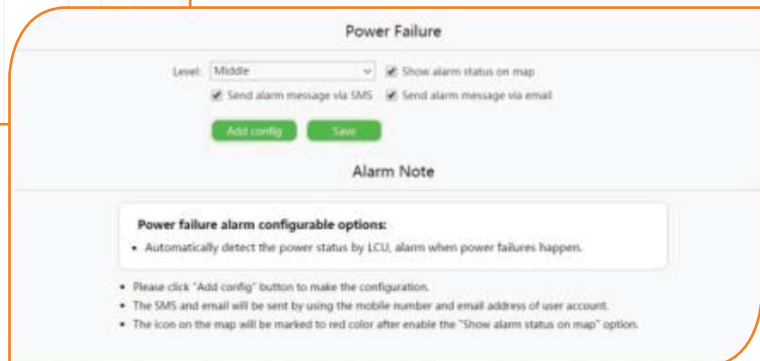


### ● Alarm system

ID	Status	Level	Station	From	Name	Type	Alarm/Clear Time	Message	Value	RTU	LCU	Address
1	●	Low	12	Meter	RTU METER-40	Power factor	2017-05-07 10:31:43	الخطأ بمعدل فرق المصفاة	B: 0.57, C: 0.24	F9D5		1
2	●	Low	11	Meter	RTU METER-40	Power factor	2017-05-07 10:00:39	الخطأ بمعدل فرق المصفاة		FC28		1
3	●	Low	11	Meter	RTU METER-40	Power factor	2017-05-07 10:00:05	الخطأ بمعدل فرق المصفاة	C: 0.70	FC28		1
4	●	Middle	12	Pole	2/17 1 - شارع بن مسعود	Lamp failure	2017-05-07 09:57:30	عطل المصباح		F9D5	59236	0
5	●	Middle	12	Pole	2/17 1 - شارع بن مسعود	Lamp failure	2017-05-07 09:52:13	عطل المصباح		F9D5	59236	0
6	●	Middle	12	Pole	1/05 التصفيرة	Door open	2017-05-07 09:26:11	فتح باب المصود		F9D5	56C2D	0
7	●	Middle	12	Pole	1/05 التصفيرة	Door open	2017-05-07 09:26:09	فتح باب المصود		F9D5	56C2D	0
8	●	Low	12	Pole	C4 1 - التوسية	Capacitor failure	2017-05-07 09:09:17	عطل المكثف		F9D5	59486	0
9	●	Middle	12	Pole	1/06 التصفيرة	Node lost	2017-05-07 09:02:46	فقد العنصر				
10	●	Middle	12	Pole	1/06 التصفيرة	Node lost	2017-05-07 09:02:42	فقد العنصر				
11	●	Middle	12	Pole	1/06 التصفيرة	Door open	2017-05-07 09:01:28	فتح باب المصود				
12	●	Middle	12	Pole	1/06 التصفيرة	Door open	2017-05-07 09:01:28	فتح باب المصود				
13	●	Middle	12	Pole	A4 1 - الواسط	Lamp failure	2017-05-07 08:46:45	عطل المصباح				
14	●	Middle	12	Pole	A4 1 - الواسط	Lamp failure	2017-05-07 08:46:07	عطل المصباح				
15	●	Middle	12	Pole	1/06 التصفيرة	Door open	2017-05-07 08:37:53	فتح باب المصود				

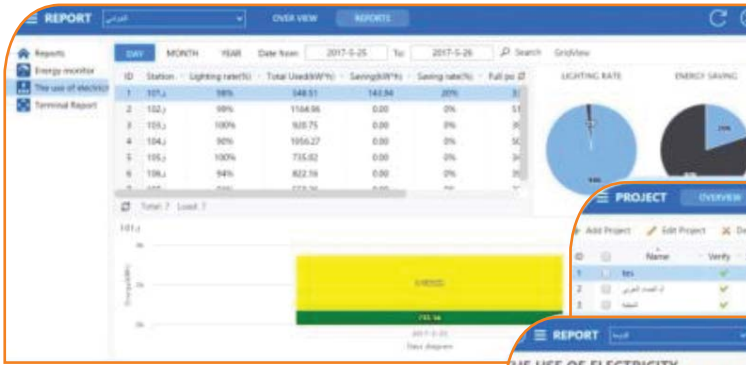
- Customized alarm types & conditions
- Multiple alarm notification
- Alarm tracking and positioning
- Alarm trace back and statistics
- Alarm fast synchronization

Real-time alarm system

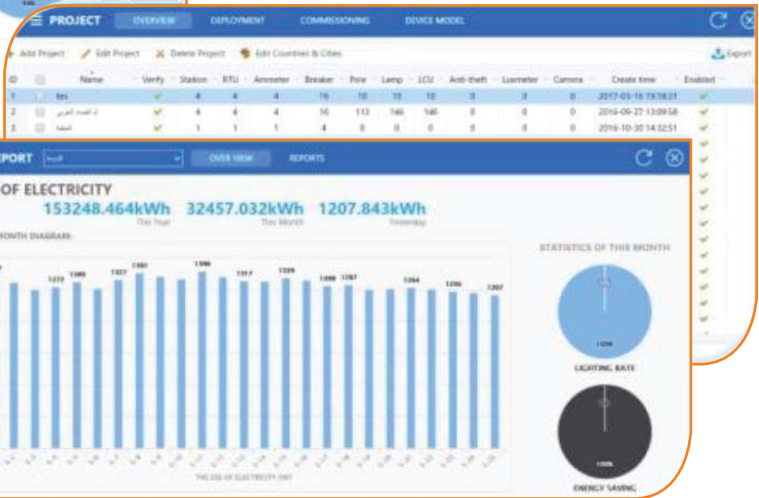


# SCCS

## ● Energy report



- Real-time energy consumption monitoring
- Energy saving rate, light rate statistics
- Electricity cost reference



- Date/Month/Year data statistics
- Data Export
- Equipment status statistics
- Data records saved for more than 30 years

## ● Assets management

ID	Name	UID	Verify	Ammeter	Breaker	Pole	Lamp	LCD	AI	Anti-theft	Luxmeter	Camera	Lat
1	CCM	CCM	✓	2	4	4	8	8	8	8	8	8	80.2805209445786
2	PCB	PCB	✓	1	4	4	20	20	4	4	8	8	80.2805209445786
3	PCB	PCB	✓	1	4	4	20	20	4	4	8	8	80.2805209445786
4	PCB	PCB	✓	1	4	4	1	1	4	4	8	8	80.2805209445786

- Fast batch device information input
- Automatically UID data collection
- Lat. & Long. Data Import by batch
- Compatibility with multiple surveillance devices
- Auto-equipments commissioning

Easy deployment





# SCCS

- Environment monitoring



- Tunnel lighting



- Combined with light sensor & vehicle detector
- With entrance/tunnel/enhanced lighting

# COMMUNICATION SYSTEM COMPARISON

## ● Communication system comparison

Items	Frequency Band	Communication Distance	Communication Speed	Advantage	Disadvantage
<b>PLC</b>	/	Node to Node: 500m	5.5-20 Kbps	Security Data comm stable No special comm cable	Comm distance short High cost of maintenance Weakness of anti-inteference
<b>ZIGBEE</b>	470M/868M/915M /2.4GHz	Node to Node: 150m	250 Kbps	Auto-mesh High comm speed	Interfered by other radio Max connections only 255 nodes Comm distance short
<b>GPRS</b>	850M/900M/1800MHz	Unlimited	115 Kbps	Good Security Good anti-interference Short time of accessing Low power consumption Low maintenance High speed of Comm	Data loss
<b>NB-IoT</b>	800M/900M/1800MHz	15km	65 Kbps	Good Security Good anti-interference Low power consumption Low maintenance WLAN	Expensive NB-IoT network Public Frequency
<b>LoRa</b>	470M/868M/915MHz	10-15km ideally 1-5km urban area	0.2~37.5 Kbps	Good Security Good anti-interference Low power consumption Low maintenance WLAN, multi-connections Free frequency	Low speed of communications Max connection 500-1000 node Long distance

# Hardware

## Data Concentrator

(RTU200, RTU200Z, RTU200R, RTU200M, RTU500Z, RTU500M)

### ● Features

- Smart remote control by: longitude/latitude, light, time or longitude/latitude combined with light
- Fault alarms: light-on by accident, light-off by accident, power failure, power on, leakage, over voltage, under voltage, over current, AC contactor failure, breaker failure, etc.
- Built-in meter: detection for voltage, current and electrical energy data (accuracy of 0.5%)
- Support external smart power meter
- Support remote & local update
- UP communication: 2G/3G/4G/CDMA  
Down communication: PLC, Zigbee, RS485, LoRa
- Support external battery which can run for 8 hours after power off (optional)

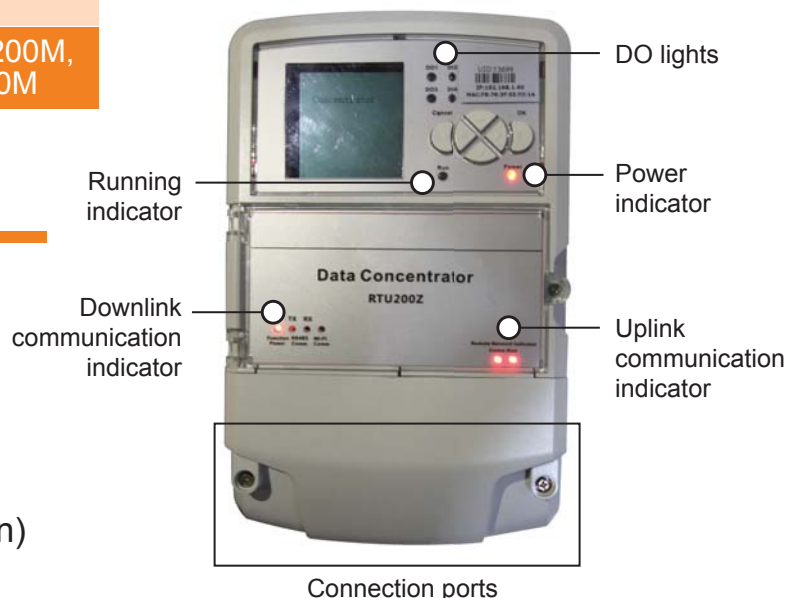


### ● Items

Down communication	Item
PLC	OLE-RTU200
Zigbee/915MHz	OLE-RTU200Z, RTU200M, RTU500Z, RTU500M
RS485	OLE-RTU200R
LORA	OLE-RTU200Z, RTU200M, RTU500Z, RTU500M

### ● Parameters

- Operating Voltage: 96-500VAC
- Working Frequency: 50-60Hz
- Power Consumption: 2-5W
- 4 DO, 8 DI (6 DC IN + 2 AC IN)
- Operating Temperature: -40-85°C
- Relative Humidity: ≤95% (No condensation)
- Size: 288mm\*177mm\*95mm



# Hardware

## Wireless Controller

AC Power Supply Series (LCU12Z, LCU16Z, LCU12M, LCU16M)

### ● Features

- Zigbee communication: frequency of 915MHz / 2.4GHz
- 96V-264V AC input (96V-400V is customizable)
- Current, voltage, power, power factor, power consumption remote reading
- Remote switching on/off, dimming
- Lighting time statistics, fault time statistics, power accumulation remote reading
- Fault alarms: lamp failure, power failure, compensation capacitor failure, pole leakage, node lost, relay failure, under voltage, over voltage, over current, lamp high temperature, lamp life-time warning
- 0-10V and PWM dimming

## DC Power Supply Series (LCU51Z, LCU51ZS)

### ● Features

- Zigbee communication: frequency of 915MHz / 2.4GHz
- DC input: 12V-60VDC/5A, 12V/30mA, 12-36VDC/50mA
- Current, voltage, power, power factor, power consumption remote reading
- Fault alarms: lamp failure, node lost, under voltage, over voltage, over current, lamp high temperature, lamp life-time warning



LCU12Z  
172mm\*56mm\*40mm



LCU15ZS  
65mm\*60mm\*32mm



LCU51G  
65mm\*60mm\*32mm



LCU16Z  
Height98mm\*Diameter84mm

# Hardware

## RS485 based Lamp Controller (for Tunnel Lighting)

### AC Power Supply Series (LCU12, LCU15, LCU22)

#### ● Features

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- PLC communication
- 96V-264V AC input (96V-400V is customizable)
- Current, voltage, power, power factor, power consumption remote reading
- Remote switching on/off, dimming
- Lighting time statistics, fault time statistics, power accumulation remote reading
- Fault alarms: lamp failure, power failure, compensation capacitor failure, pole leakage, node lost, relay failure, under voltage, over voltage, over current, lamp life-time warning
- 0-10V and PWM dimming



LCU12  
172mm\*56mm\*40mm



LCU22  
117mm\*64mm\*64mm

# Hardware

## RS485 based Lamp Controller (for Tunnel Lighting)

### Lamp Controller (LCU12R)

#### ● Features

- RS485 Communication
- 176V-242V AC input
- Current, voltage, power, power factor, power consumption remote reading
- Remote switching on/off, dimming
- Fault alarms: lamp failure, power failure, node lost, relay failure, under voltage, over voltage, over current, lamp high temperature, lamp life-time warning (different items has different alarms)
- 0-10V and PWM dimming

### Signal Controller (SCU02)

#### ● Features

- For tunnel lighting project
- RS485 communication, fast and stable
- Automatic management for lamp controllers in group
- IP Grade: IP67



LCU12R  
172mm\*56mm\*40mm

#### ● Parameters

- Operating Temperature: -40-85°C
- Relative Humidity: <95%
- IP Grade: IP67

#### PLC Communication Parameter

- Modulation Mode: BPSK
- Carrier Center Frequency: 132kHz
- Communication Rate: 5500bps
- Receiver Sensitivity: -80dB~-60dB

#### Zigbee Communication Parameter

- Communication Frequency: 2.4GHz/915MHz
- Protocol: IE EE802.15.4 Standard
- Communication Rate: 250Kbps

#### RS485 Communication Parameter

- Communication Mode: Master-slave
- Communication Rate: 9600bps
- Communication Format: 8 data bits, 1 stop bit, EVEN



# Application



- **Street Lighting**

Smart lighting control is the main way to reduce the public energy consumption, to manage each single lamp and whole public lighting easily.

- **Tunnel Lighting**

Unlike usual road lighting, tunnel lighting has its unique particularity, especially the safety of tunnel lighting system. Integrated with light sensor and vehicle detector, the smart control system could manage the lights and make it more safe.

- **Solar Lighting**

Solar lighting is getting more popular, especially in ample sunshine areas. Smart Lighting control system facilitates energy utilization efficiently.

- **Facade Lighting**

Combined with smart lighting control system, it could make the light views differently in different occasions or festival.

- **Area Lighting (Parking Lot, Sport Facilities & etc)**

The system helps to manage the parking lot in lower cost, but more modern and saving energy.