



# Smart Campus IoT Integrated Solutions

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# Catalogue

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# Company Profile

# 1.1 Company Profile



Chengdu Boost Information Technologies Inc. was founded in April 1999 and finished shareholding reform in June 2015, with a registered capital of RMB 60.91 million. It was listed in the National Equities Exchange and Quotations (NEEQ) in October 2015, and owns a wholly-owned subsidiary, Chengdu Boost Electric Engineering Co., Ltd.

We devote ourselves to the development of IoT system and communication devices with own intellectual property rights, and focus to application of IoT industry (including water, electricity and gas management, water quality monitoring, smart agriculture, smart buildings and smart communities, etc.) As the full member of international and domestic LoRa Alliance, we are domestic first batch of companies specialized in LoRa R&D and application.





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## **Status and Difficulties**

# 2.1 What's Smart Campus ?

Smart campus indicates the integrated environment of working, studying and living based on the IoT technology. Using various application service system as carrier, it fully integrates teaching, research, management and school life all together.

More specifically, smart campus embeds and installs sensors in canteens, classrooms, libraries, water supply system, labs and other application scenarios. They are extensively connected to build the IoT, which is then combined with Internet, so as to integrate teaching and living with campus resources and system.



## Teaching

Daily teaching, smart libraries and labs management, etc.



## Security

Intruder alarm system, license plate recognition, E-police, visitor system, mobile smart card, etc.



## School Life

Comprehensive management of canteen, bathroom, smart lighting, vehicles, personnel. Smart logistical support and E-sentry, etc.

# 2.1 Main Features of Smart Campus



## **Intellisense environment and service platform of IoT**

Provide teachers and students with comprehensive intellisense environment and integrated info. service platform, as well as personal customized service.



## **Apply various sensors to campus management**

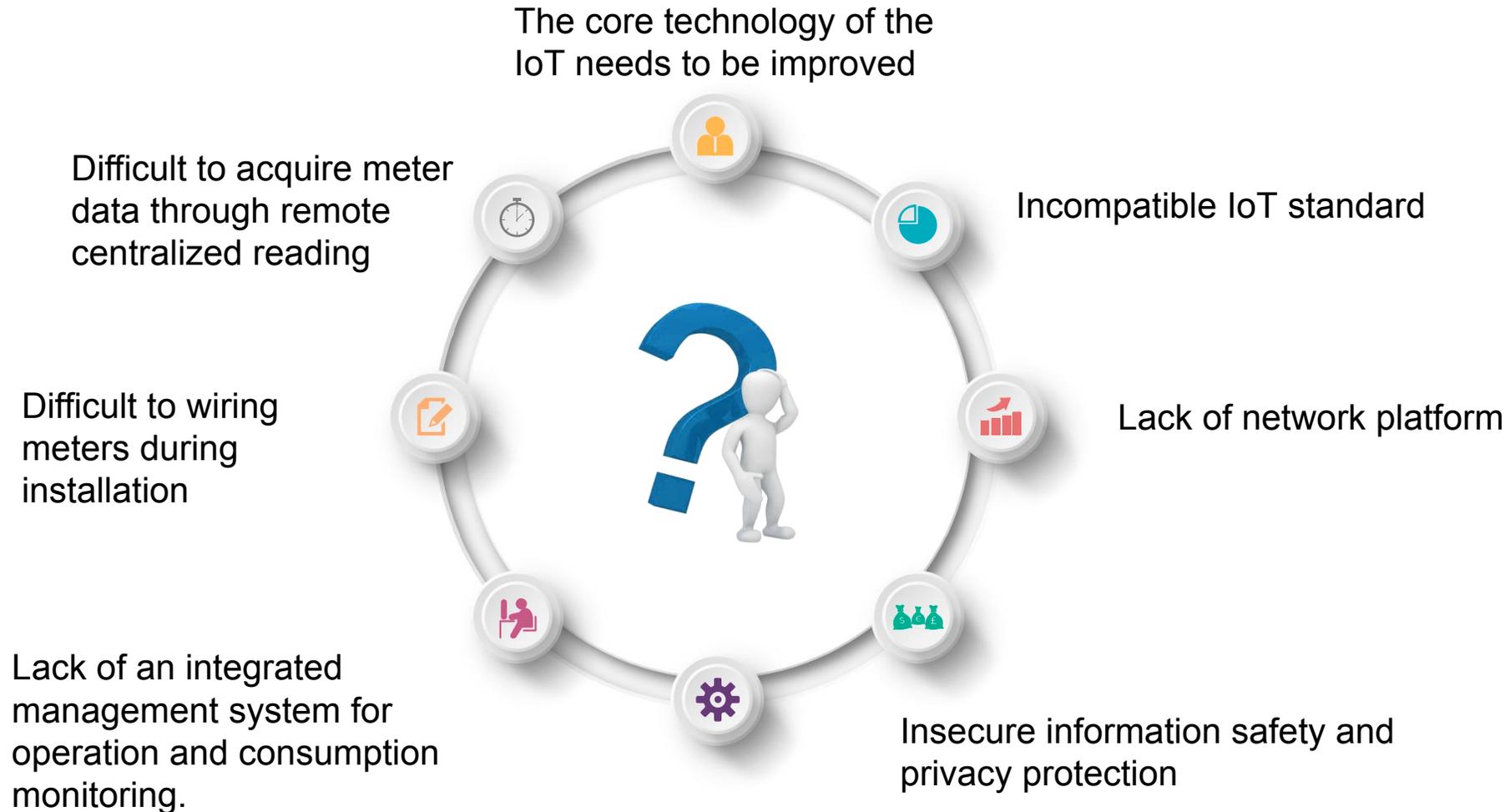
Computer network-based information services will be integrated into different applications scenarios to achieve interconnection and collaboration.



## **Combine intellisense environment and info. service platform**

The intellisense environment and info. Service platform provide an interface for schools to communicate and perceive the outside.

# 2.2 Difficulties of Campus Management

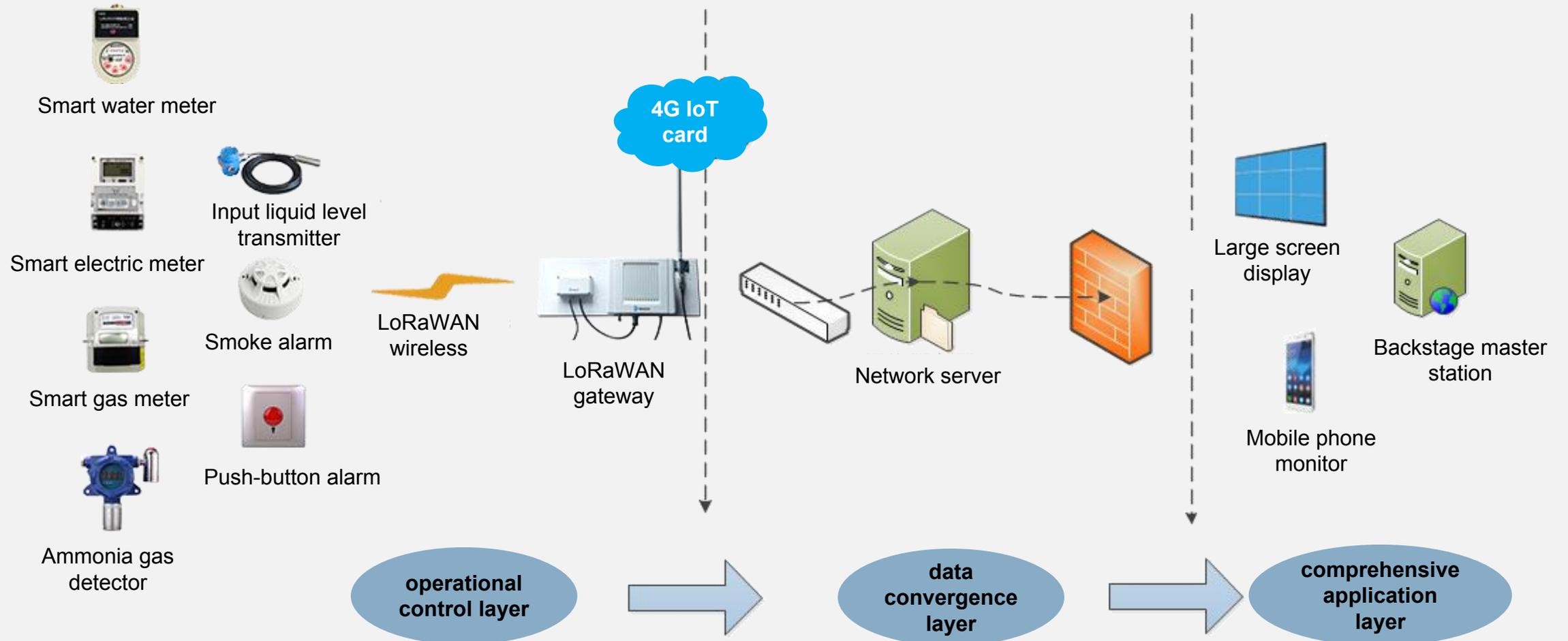




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# Introduction of Solutions

# 3.1 Topological Graph



## 3.2 Application-Smart Electric Meter

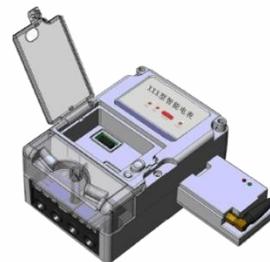
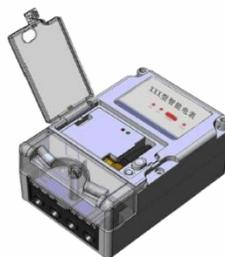
TXJLRW-BGS1 communication unit (electric meter/ LoRa wireless) is a kind of IOT communication module with ultra-long distance transmission, using LoRa debugging technology, and following LoRaWAN wireless transmission protocol. It can auto-acquire electric meter address so as to build IOT network rapidly, and cooperate with LoRaWAN gateway to realize data Transmission, monitoring and smart management. At present, it is widely used in the field of electric data acquisition.



Communication unit  
(electric meter/LoRa  
wireless)



Acquisition unit II  
(LoRaWAN wireless)



### Communication Parameters :

- ◆ Embedded in smart electric meter to communicate with other terminals.
- ◆ Support LoRaWAN wireless transmission protocol.
- ◆ With ultra-long distance and large coverage.
- ◆ Ultra-high receiving sensitivity, up to -146dBm.
- ◆ Low power consumption design, overall power consumption  $\leq 0.5W$ .

# 3.3 Application-Smart Water Meter

Water meter based on a mechanical water meter and equipped with an electronic remote transmitting device. The metering performance conforms with national Drinking Cold Water Meter Specification and Electronic Remote Transmitting Water Meter Standard. It adopts photoelectric coding to read the data directly with mature technology. The remote transmitting data is stable, accurate and reliable with no accumulated error. Instant meter reading when power on and free from effect of power cut. IP68 waterproof protection ensures the meter will not be influenced by water and fog.



Smart water meter  
( minor-caliber )



Smart water meter  
( large-caliber )

## Communication Parameters :

- ◆ Ultra-long communication distance.
- ◆ Low power design, energy conservation and environment protection, minimum standby current  $\leq 1.5\mu\text{A}$ .
- ◆ Ultra-high receiving sensitivity, up to  $-146\text{dBm}$ .
- ◆ High capacity network with flexibility and low cost.
- ◆ Support CJ / T188-2004 Data transmission Technical Specification of Household Metering Devices.

# 3.4 Application-Smart Gas Meter

LoRaWAN-BGQ1 smart gas meter is a self-developed smart meter based on LoRaWAN communication, with functions of gas usage metering, value control and remote monitoring. It uses LoRa modulation technology, follows LoRaWAN wireless transmission protocol and cooperates with LoRaWAN gateway, so as to realize remote monitoring and smart management.



Smart gas meter (LoRa wireless)

## Communication Parameters :

- ◆ Operating power : 4.5V (AA\*3) battery powered
- ◆ Operating temperature: - 25°C ~ 55°C
- ◆ Relative humidity : 10% ~ 100%
- ◆ Quiescent dissipation: <15uA
- ◆ Transmission protocol : LoRaWAN wireless
- ◆ Transmitting power : ≤17dBm
- ◆ Receiving sensitivity : 146dBm @10Kbps

# 3.5 Application-Smoke Alarm

LoRaWAN-BGY1 wireless smoke alarm uses low power consumption wireless LoRa chip and smart microprocessor to process alarm signal, and realize ultra long distance data transmission, with the dust and insect prevention, anti-light interference from outside. The design guarantees the stability of our product. The product can respond quickly to the smoke of slow smoldering and burning, and remind users in-time to guarantee personal and property safety. It widely used in the smoke monitoring of indoor and outdoor environment at dwellings, factories, malls, hotels, restaurants, office buildings, teaching buildings, banks, libraries, warehouses, etc.



Smoke alarm (LoRaWAN wireless)

## Communication Parameters :

- ◆ Operating voltage: 9V battery ( 6F22 )
- ◆ Quiescent current:  $\leq 15\mu\text{A}$
- ◆ Communication current:  $\leq 130\text{mA}$
- ◆ Battery life:  $\geq 2$  years
- ◆ Power indicator: intermittent red LED
- ◆ Alarm indicator: rapid flashing of red LED
- ◆ Alarm sound pressure:  $\geq 85\text{dB/m}$
- ◆ Operating temperature:  $-10^{\circ}\text{C} \sim +50^{\circ}\text{C}$
- ◆ Alarm method: sound-light alarm

# 3.6 Application-Ammonia Gas Detector

The ammonia gas detector is used to detect the ammonia concentration in the environment with portable property. When the concentration of ammonia reaches or exceeds the preset alarm value, the ammonia detector will send out sound-light and vibration alarm signal. It is widely used in refrigeration rooms, labs with ammonia gas, ammonia gas storage warehouses and other industrial environment to prevent poisoning and explosion accidents and protect life and property.



Ammonia gas detector

## Communication Parameters :

- ◆ Detection: ammonia gas
- ◆ Calibration: automatic calibration and zero setting
- ◆ Back light: low light/ alarm with automatic back light
- ◆ Sensor: plug-in electrochemical sensor(with temperature compensation)
- ◆ Alarm : clearly identified sound-light alarm
- ◆ Light alarm : flashing red LED or LCD
- ◆ Sound alarm : 95dB (0.3 meters)alterable alarm

# 3.7 Application-Push-button Alarm

When a child or patient is at home alone, a portable emergency button can send an alarm message to you or the alarm receiving center at any time. It is widely used in banks, schools, factories, hospitals, communities and other fields.



Push-button alarm

## Technical parameters :

- ◆ Type : PB-28B
- ◆ Automatic/key reset
- ◆ Alarm method: normal open/normal close

# 3.8 Application-Input Liquid Level Transmitter

Input liquid level transmitter is a pressure sensor for liquid level measuring . It communicates through LoRaWAN and is based on the principle that the measured liquid static pressure is proportional to the height of the liquid. The transmitter adopts isolated diffusion silicon sensitive element or ceramic capacitance pressure sensitive sensor to convert static pressure into electrical signal, which is then converted into standard electrical signal through temperature compensation and linear correction. It is applied in liquid level measurement of petrochemical, metallurgy, electricity, pharmacy, water supply, environmental protection and other industries.



Input liquid level transmitter

## Technical parameters :

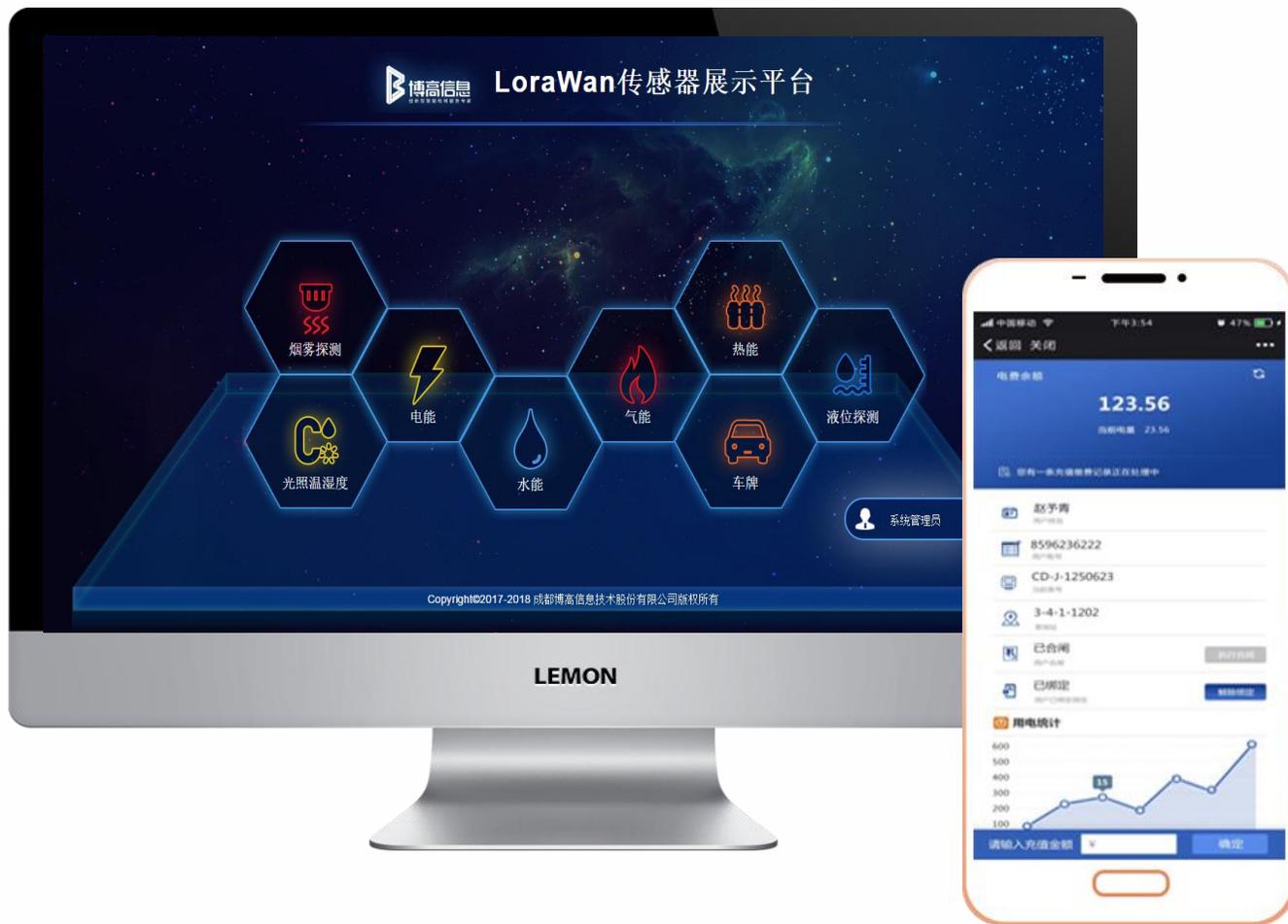
- ◆ Measurement range : 0.3 ~ 110m
- ◆ Accuracy : 0.2、 0.5、 1.0 degree
- ◆ Operating temperature : -20 ~ 80°C
- ◆ Output signal : two-wire 4 ~ 20mADC
- ◆ Supply voltage : standard 24VDC ( 12 ~ 36VDC )
- ◆ Dead zone :  $\leq \pm 1.0\%FS$
- ◆ Load capacity : 0-600 $\Omega$
- ◆ Relative temperature :  $\leq 85\%$
- ◆ Protection Grade : IP68



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# System Application and Big Data

# 4.1 Energy Consumption Monitoring Master Station and APP Application



Mainly targeted at schools, medical care, property, shopping malls, factories, agriculture and electricity selling companies.



Based on remote data centralized acquisition of all kinds of sensors and metering devices.



Start from metering cost control management, in the direction of energy efficiency management and on the platform of IoT expansion.

# 4.2 Smart Campus-Big Data Application & Analysis



## Canteen management :

The reader reads the balance of card with RFID electronic tags and deduct spending.

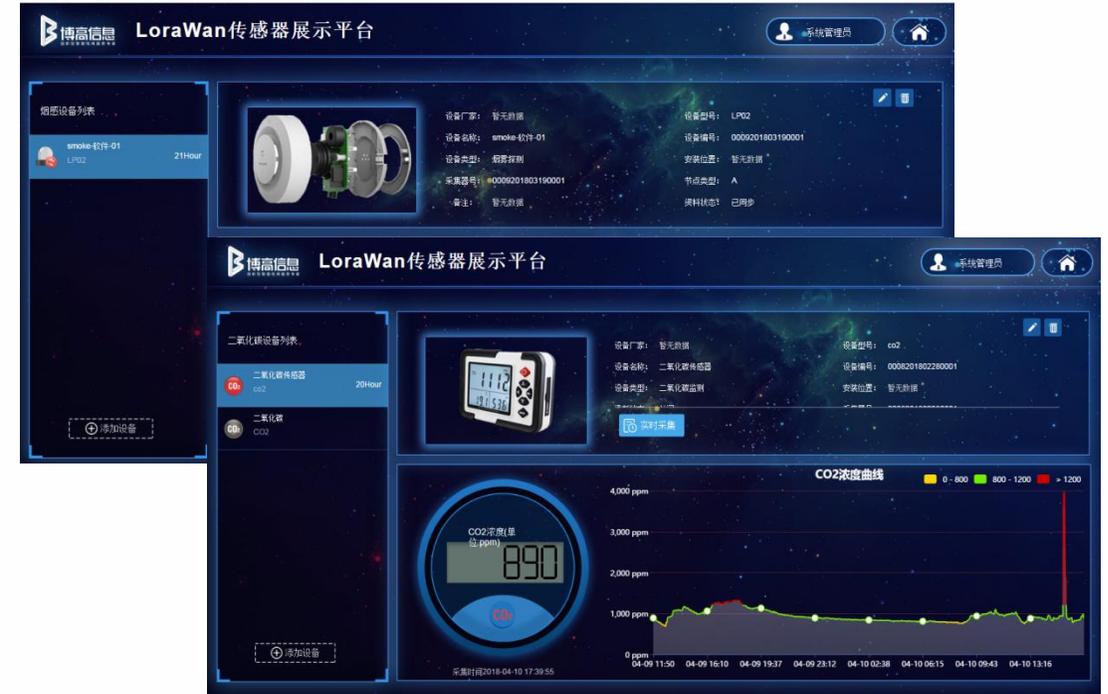


## Bathroom water control mgt.:

When the RFID card is in the reader induction area, the reader will displays the balance and immediately enters the billing state.

Consumption model: real-time charging . Fee deducted based on the water consumption.

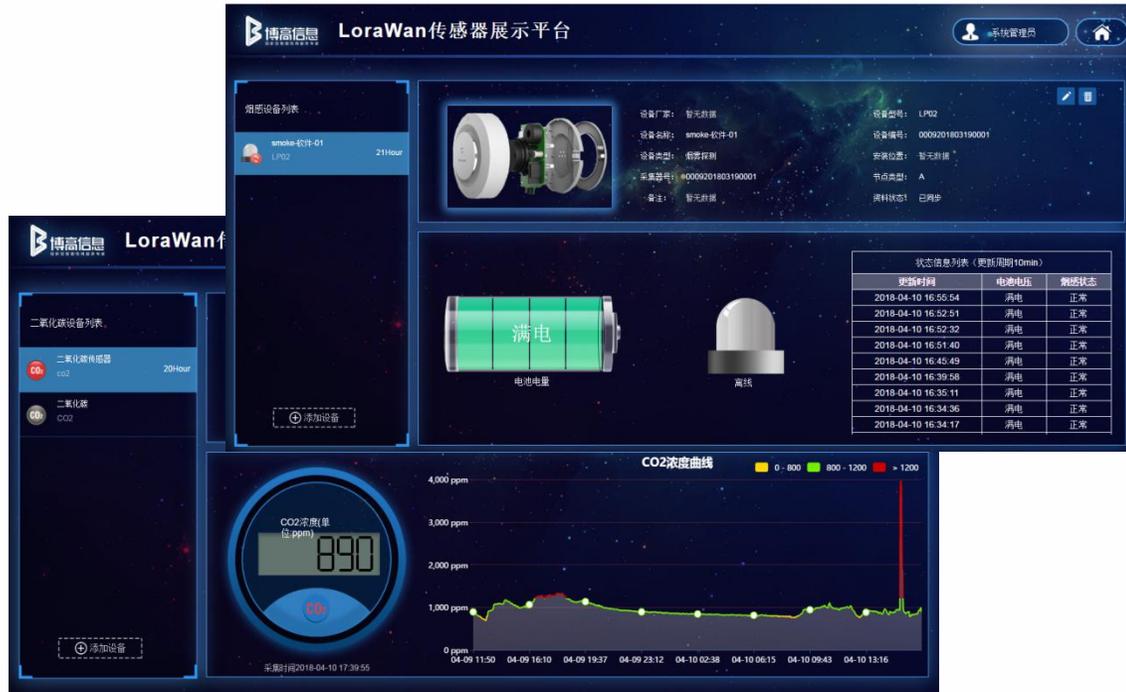
Charge model: connect the pulse flow meter. It is charged according to the use of flow.



## Security monitoring and mgt.:

Monitor inflammable and harmful gas effectively to protect life and property.

# 4.3 Smart Campus-Big Data Application & Analysis



## Lab management:

Apply IoT into equipment mgt., experimental process and smart socket, etc.

## Attendance management :

The equipment in the classroom receives students' card records and sends them to the remote server, which will store the data in the database. Teachers can check the attendance of the class.

## Smart lighting:

Using IoT technology to realize remote monitoring and control of every lamp. The light can be adjusted according to time and illuminance.

## Smart library:

Achieve intelligent service and management without manual service through IoT.

**Thanks !**

