



# LIGHTING TECHNOLOGY DEVELOPMENT AND TREND

Jing Wang

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Lighting technology status

Intelligent control in lighting

The development trend of lighting in future

# Lighting technology status

## Lighting development



Incandescent lamp

Gas discharged lamp

CFL

LED lamp

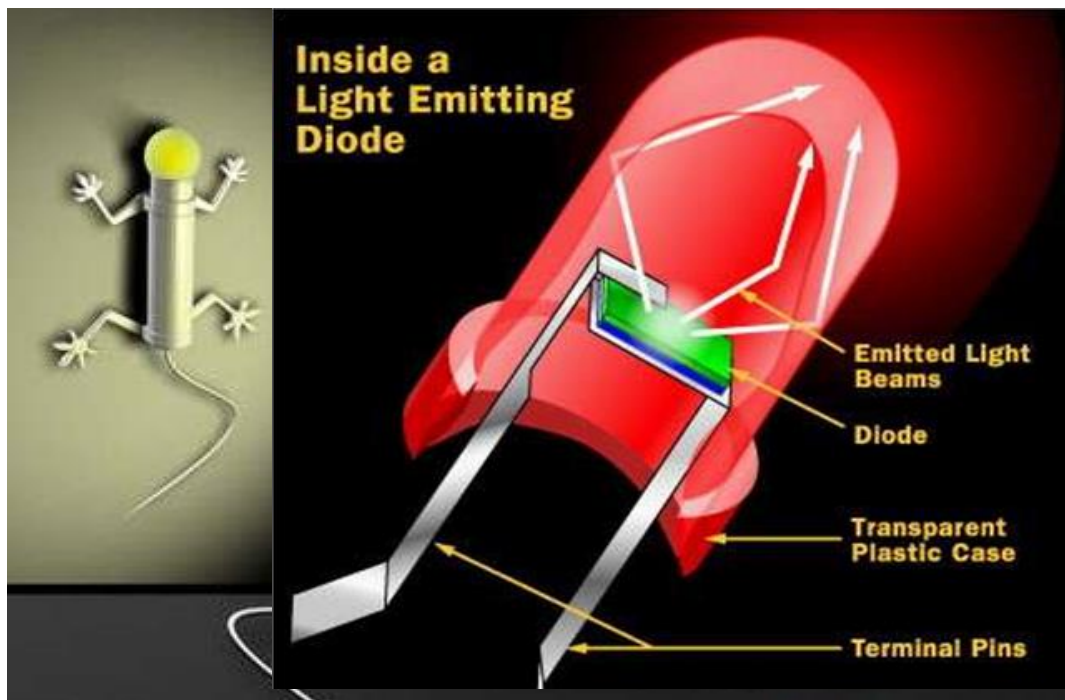
# Lighting technology status

## Market demands



# Lighting technology status

## LED



- Energy Conservation
- Long Lifetime
- Small Size
- High Luminous Efficacy

# Lighting technology status

## Commonly used LED lighting products

LED panel  
LED bulb  
LED reflector  
LED downlight



LED tunnel lighting  
LED street lighting



# Lighting technology status

## Commonly used LED lighting products



LED bulb



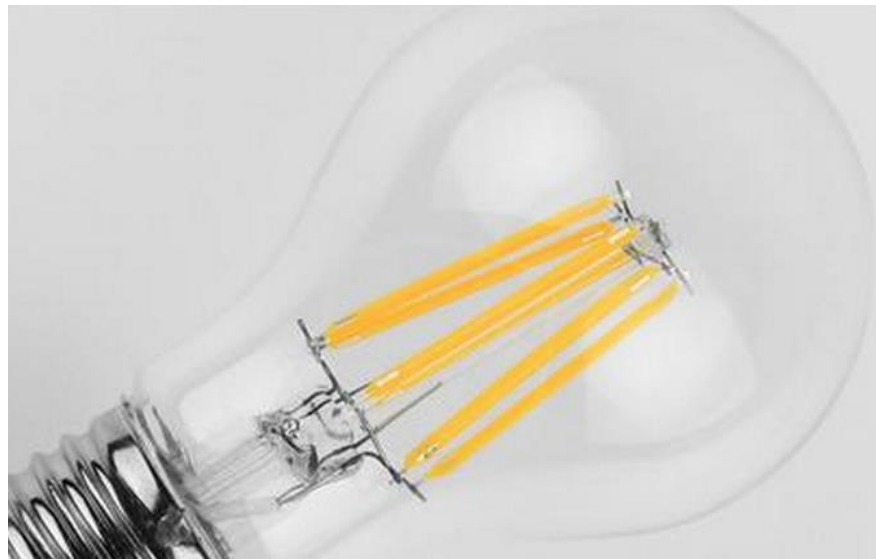
LED tube

# Lighting technology status

## LED filament bulb



incandescent lamp



Imitation of incandescent lamp

## LED lamp Classification – by luminous flux

<b>Classification Self-ballast LED lamp</b>
150 lm
250 lm
500 lm
800 lm
1000 lm
1500 lm
<b>2000 lm</b>
<b>3000 lm</b>

- **IEC 62612 Ed.1 CDV**
- **GB/T 31112 2014**

# Lighting technology status

## LED lamp Classification– different heat sink materials



Plastic



Aluminum



Ceramic

# Lighting technology status

## LED lamp Classification-- different lamp bases

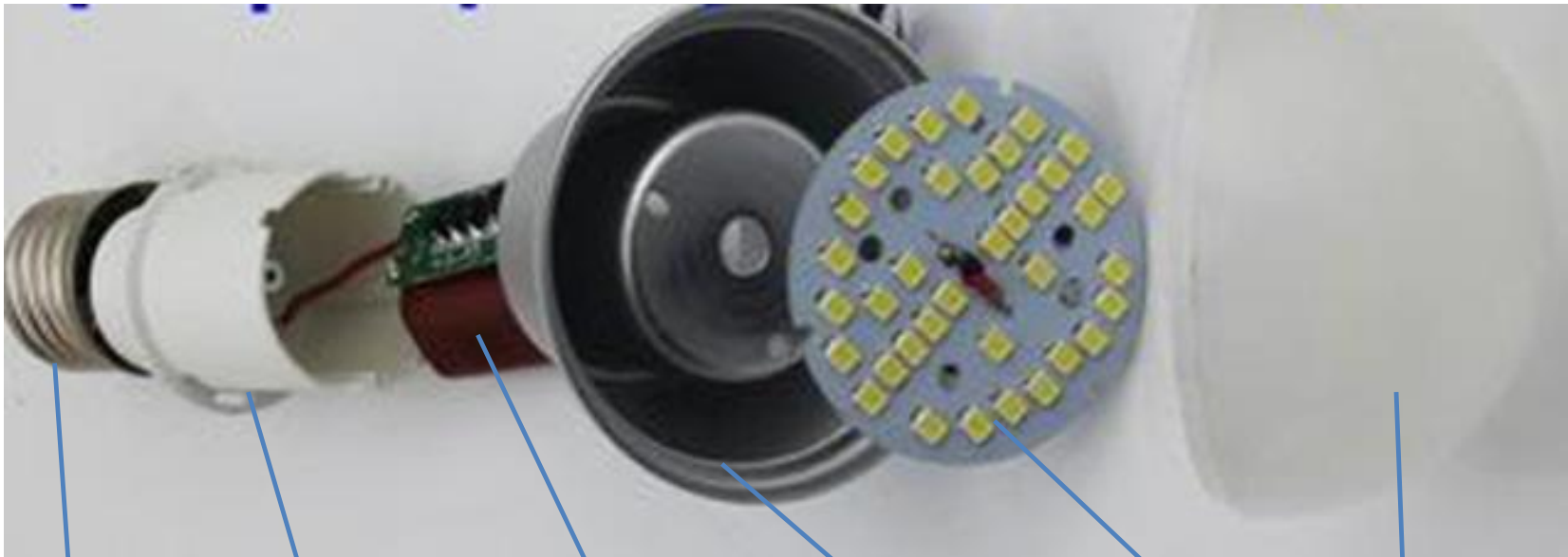


**GU10**



# Lighting technology status

## LED lamp structure



Lamp base

lampstand

driver

Heat sink

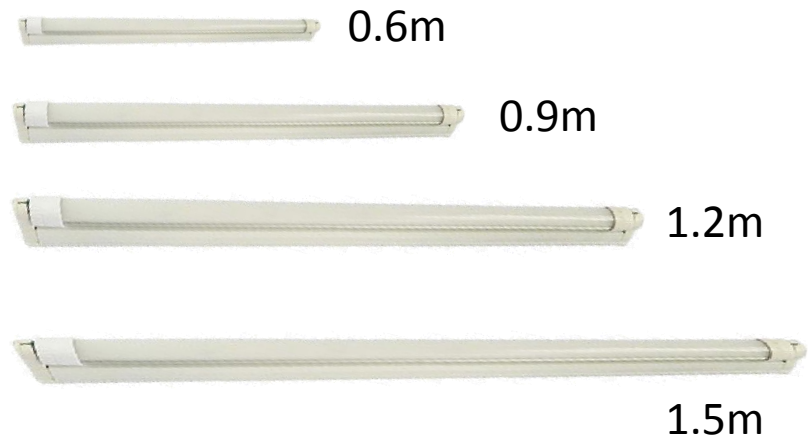
LED chip

cover

# Lighting technology status

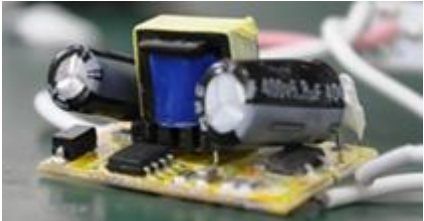
## LED tube classification-- different sizes

Size	T5	T8	T9	T10
Tube length	0.6m	0.9m	1.2m	1.5m



# Lighting technology status

## LED tube structure



**Driver**



**Lamp panel**



**Heat sink (Aluminum)**



**Lamp base**

## Luminous efficacy comparison

	<b>Luminous Efficacy</b>
Incandescent lamp	≈15 lm/W
CFL	≈65 lm/W
LED bulb	≈90 lm/W
LED tube	≈100 lm/W



monkeylight



WIFI



音乐无处不在  
分享优美旋律,用音乐倾听彼此!



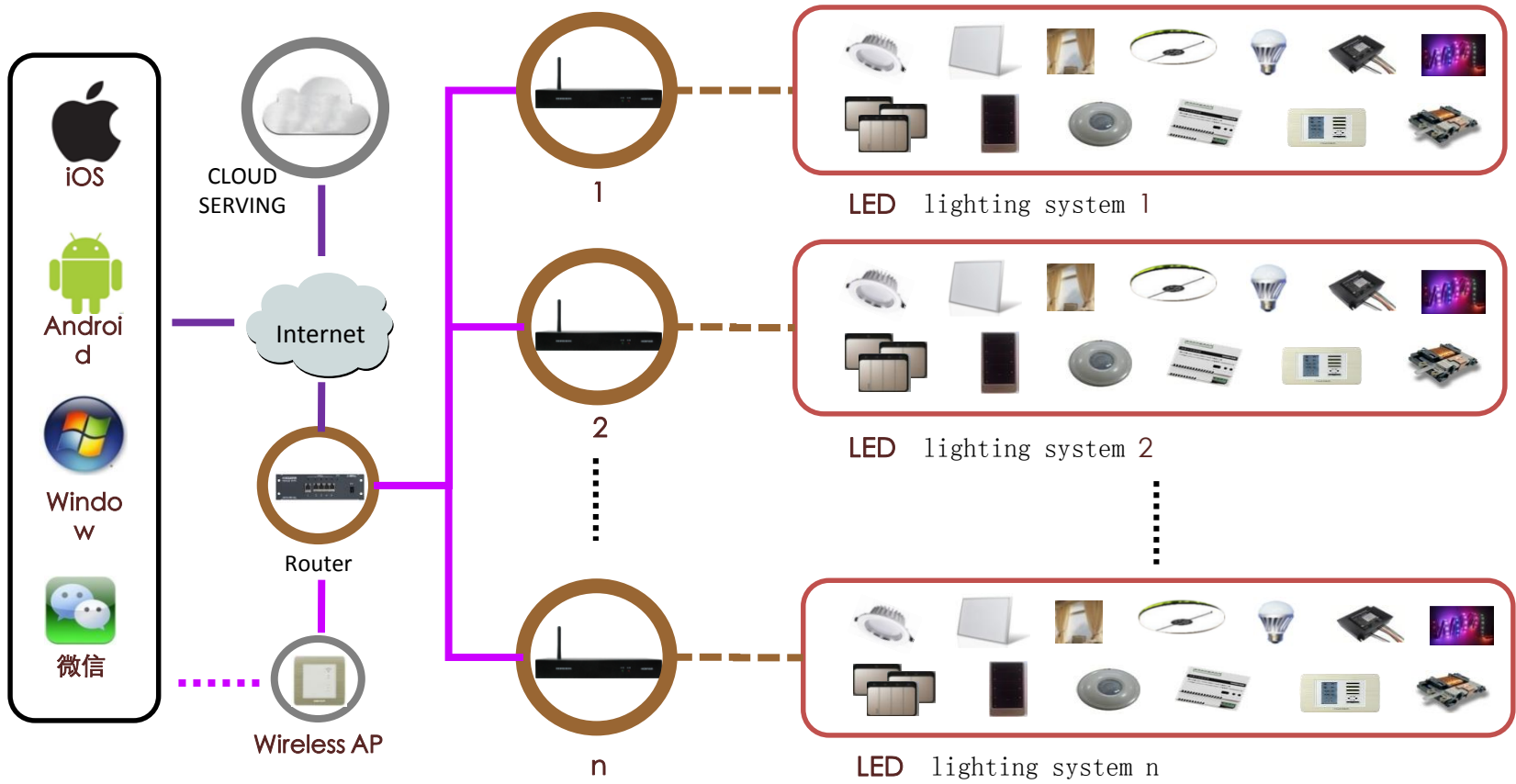
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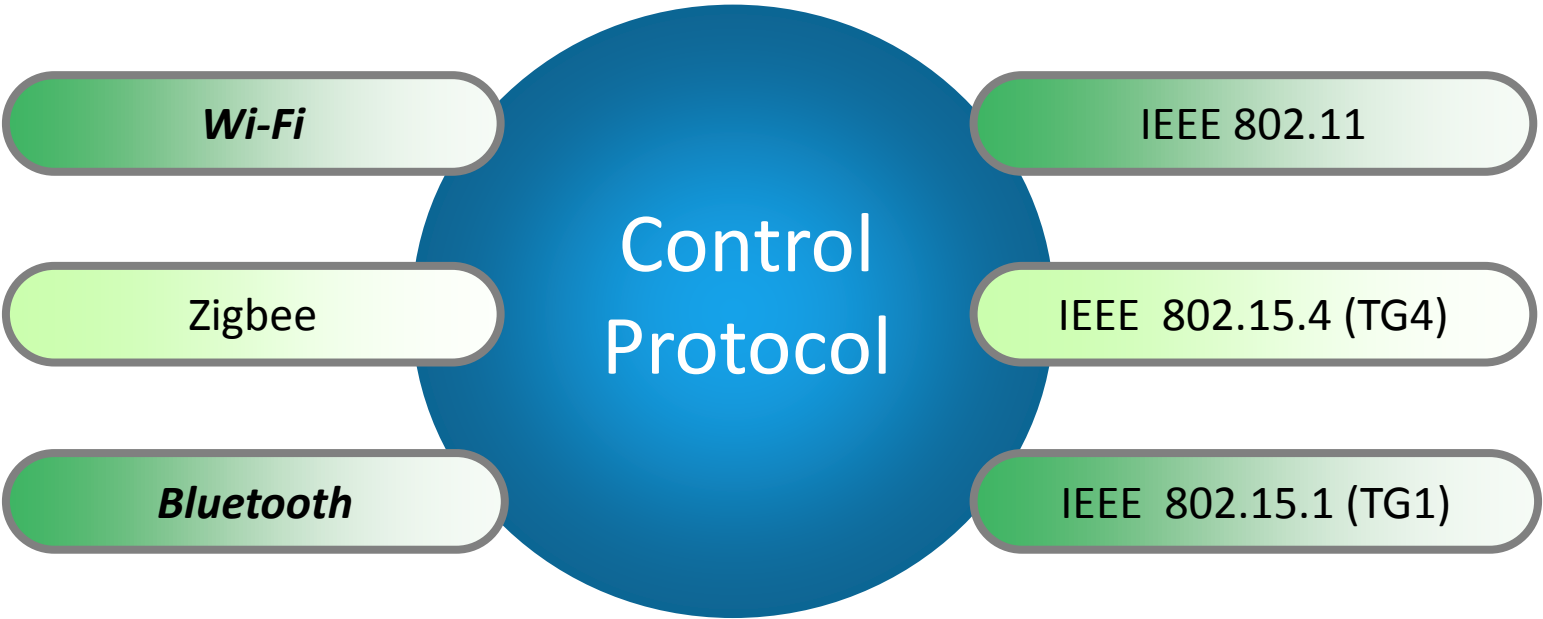
T SQUARED INDUSTRIES



## The trend --- Lighting system



## What is control protocol ?



# Intelligent control in lighting

## Wi-Fi



# Intelligent control in lighting

## Zigbee



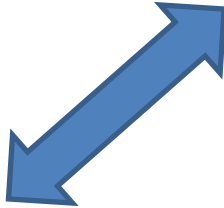
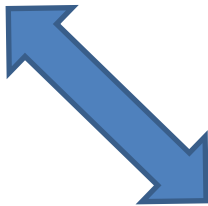
# Intelligent control in lighting

## Bluetooth



# Intelligent control in lighting

## Cooperation



Technical Evaluation Alliance  
for Solid State Lighting

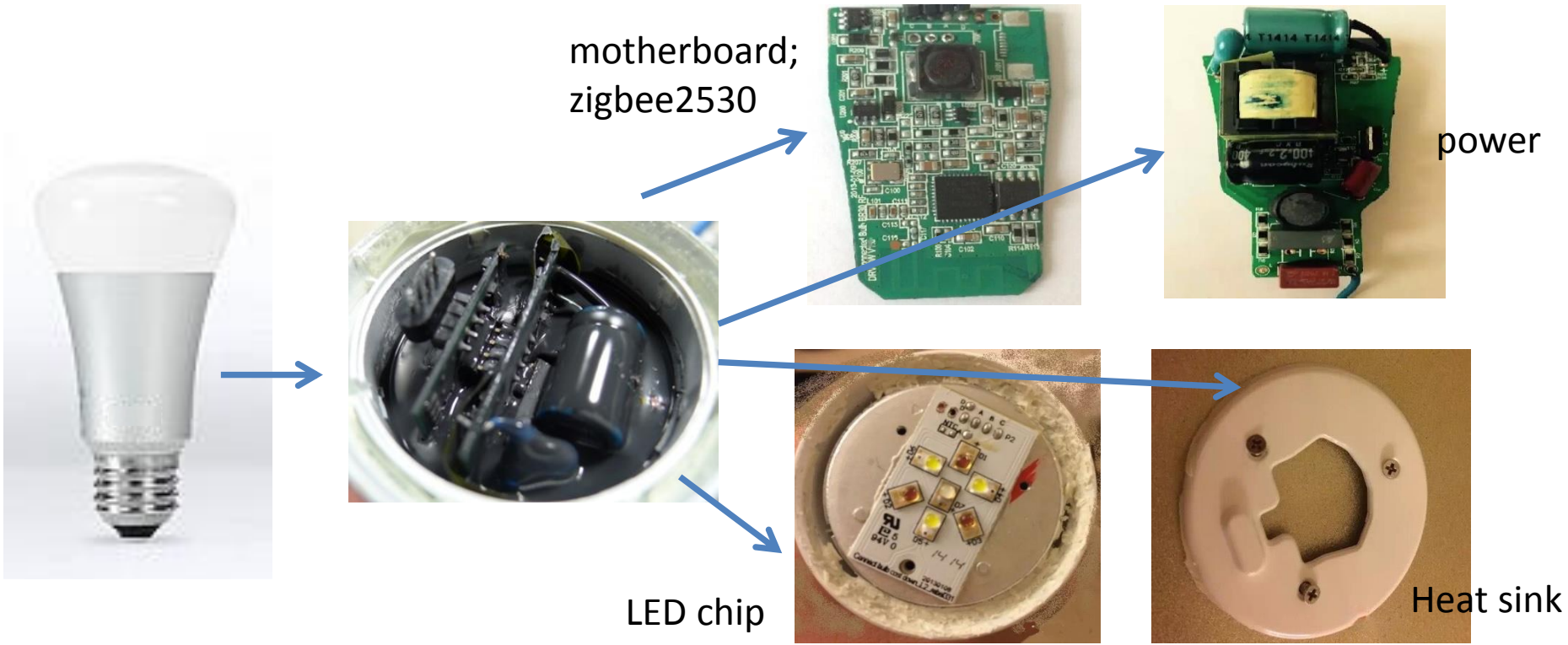
# Intelligent control in lighting

## Intelligent control protocol in LED lighting



# Intelligent control in lighting

## Intelligent control protocol in LED lighting



# The development trend of lighting in future

## The trend --- Human centric



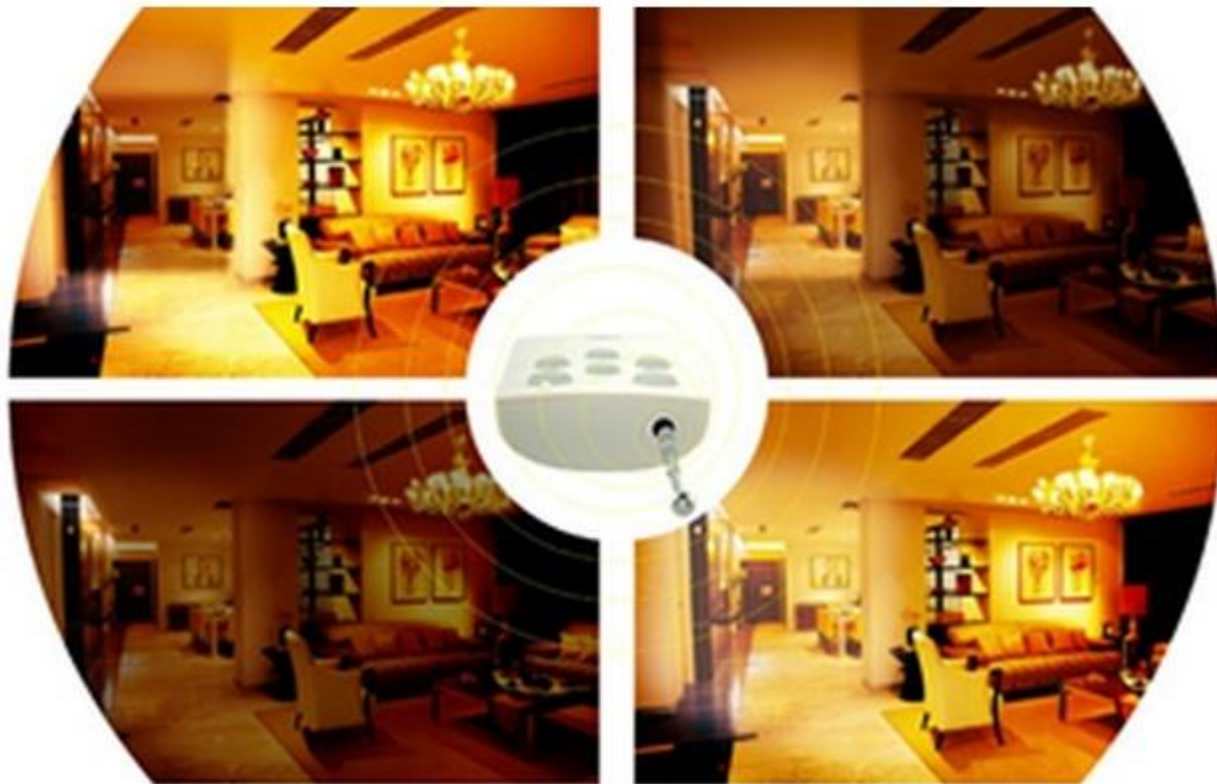
# The development trend of lighting in future

## The trend --- Human centric



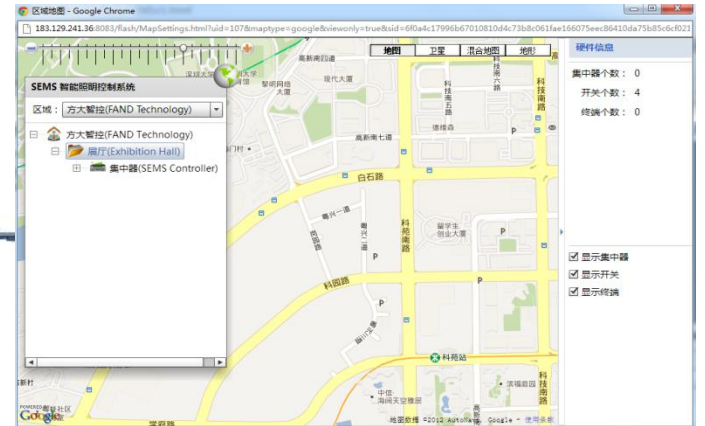
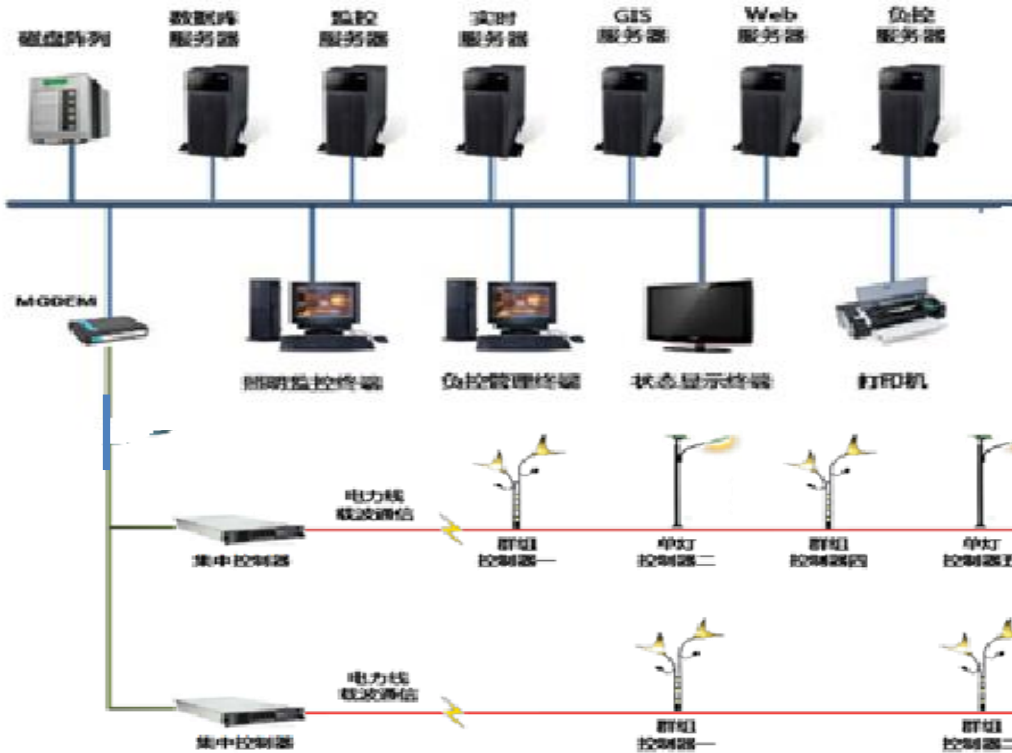
# The development trend of lighting in future

## The trend --- Human centric

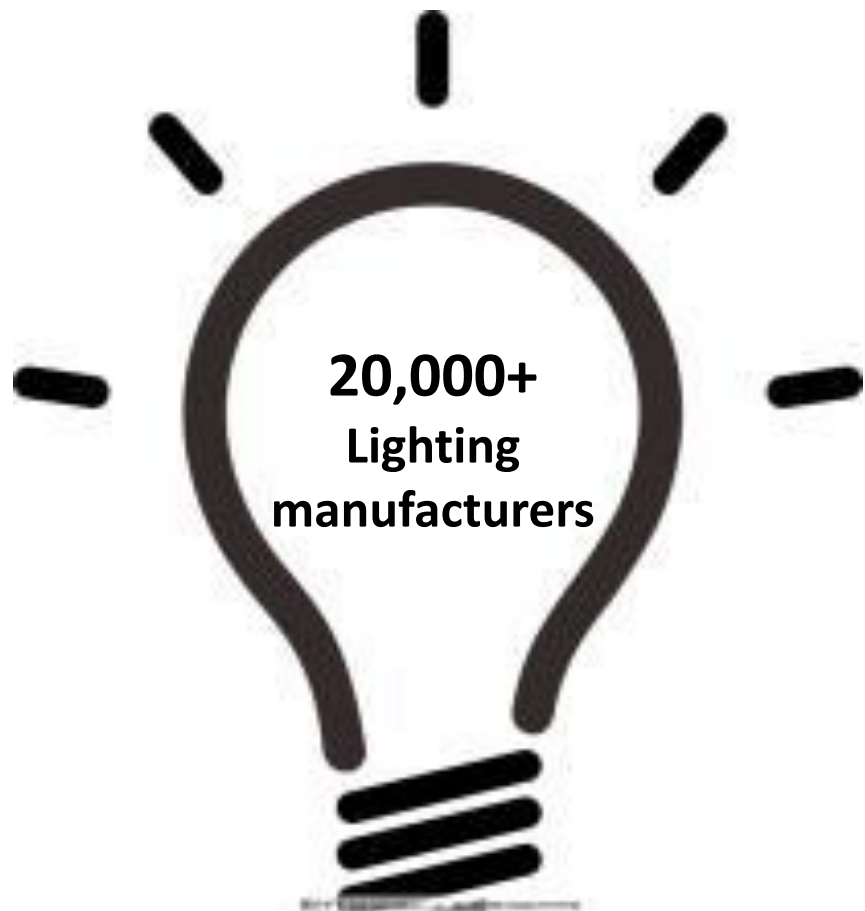


# The development trend of lighting in future

## The trend --- Human centric



# The development trend of lighting in future





Energy saving **80%**

OPEX reduction **90%**

Source: National Highway Test Centre  
China

Huawei website

# The development trend of lighting in future

*Production, consumption patters will be changed*



## Intelligent lighting

- Morphological changes
- Functional changes
- ...



## Human centric

- Smart home/city
- Adapt to the physiological response
- ...



## Beyond lighting

- Agriculture lighting
- Medical lighting
- ...



Non-visual Lighting

*Thank you!*





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**CTCN contact details:**

Climate Technology Centre and Network

UN City, Marmorvej 51

DK-2100 Copenhagen, Denmark

+45 4533 5372

[www.ctc-n.org](http://www.ctc-n.org)

[ctcn@unep.org](mailto:ctcn@unep.org)