

# **LED Smart Lighting Trends in China**

**State Key Laboratory of Solid State Lighting**

**Changzhou Institute of Technology Research for Solid State Lighting**

**2018-6-5**

**WangMingming**

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**LED Industry Status in China**

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**Smart Lighting Development Trend**

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**State Key Laboratory of Solid State  
Lighting**

# LED Industry Development Status in China

## ■ LED Lighting

- Successful technological revolution in lighting
- Dominant position in lighting industry revolution
- Important direction of strategic emerging industries

Industry chain



material, epitaxy



chip packaging, module



application, system



display



backlight



lighting



security system



agriculture



Electronic society



medical and health care

Upstream

Midstream

Downstream

Not only lighting, but also the core breakthrough of the next generation of optoelectronics and information technology

# China becomes the biggest LED manufacturer, application and exporter



- Tech parameter(Photoelectric efficiency): 20lm/W—

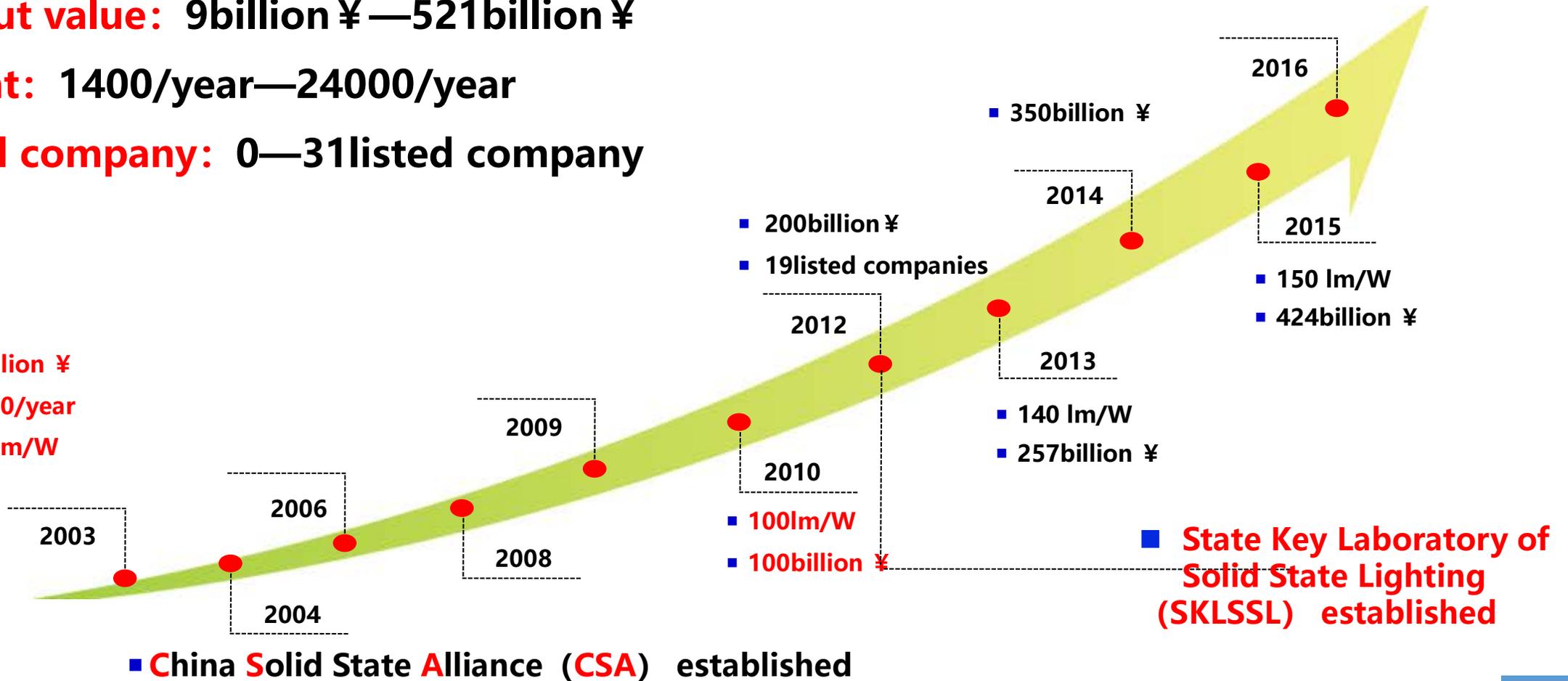
160lm/W

- Output value: 9billion ¥—521billion ¥

- patent: 1400/year—24000/year

- Listed company: 0—31listed company

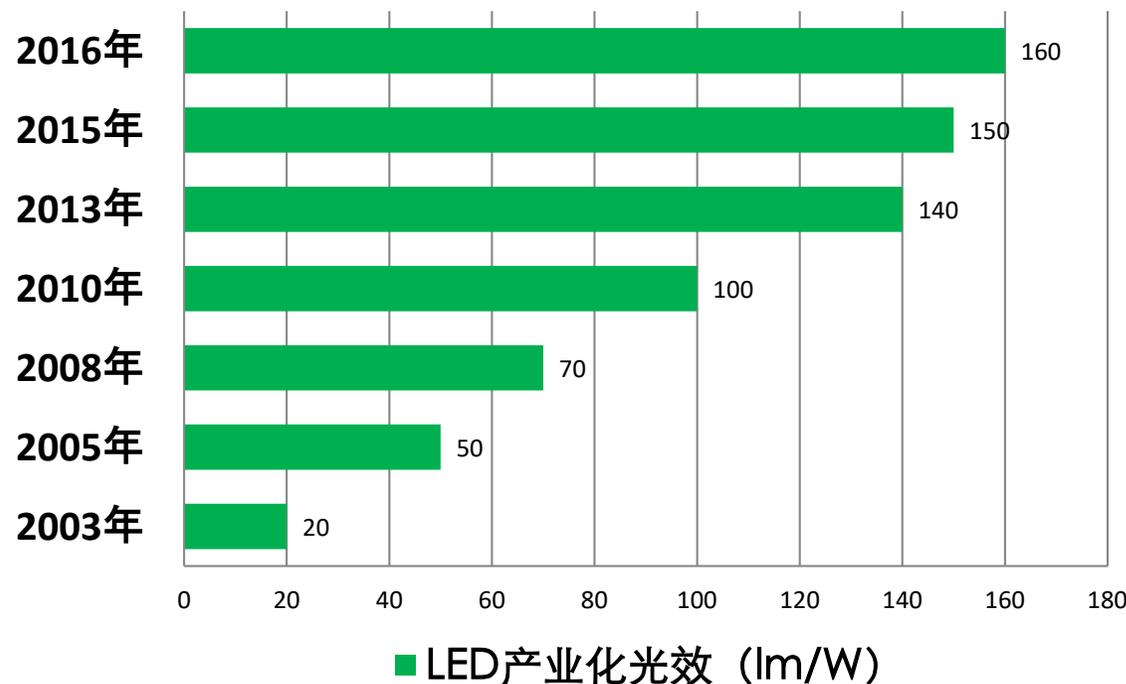
- 9billion ¥
- 1400/year
- 20 lm/W





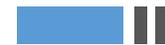
# Core technology breakthrough

- White LED industrial lighting efficiency **160lm/W**
- LED indoor lighting efficiency **90lm/W**, outdoor lighting efficiency :**110lm/W**
- OLED industrial lighting efficiency exceeds **60lm/W**, LED small pitch display with minimum spacing **0.9mm**



2003-2016white LED industrial lighting efficiency

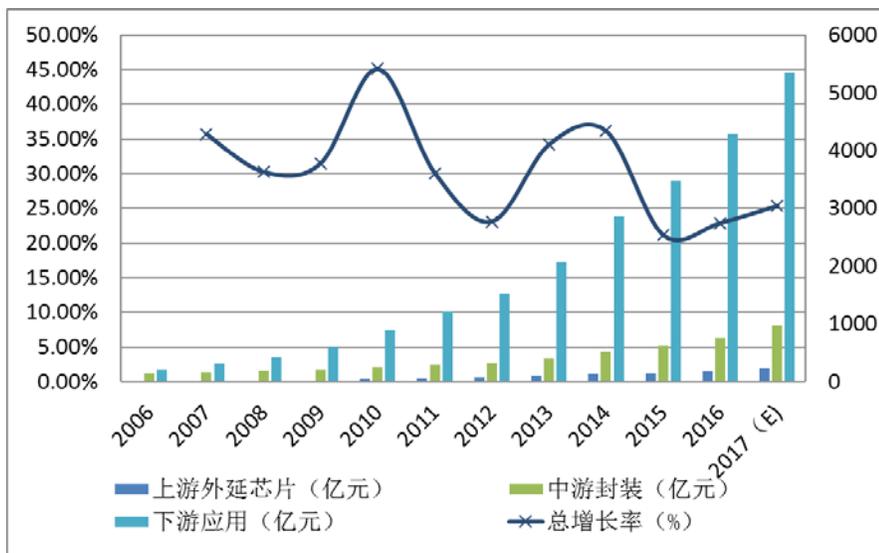
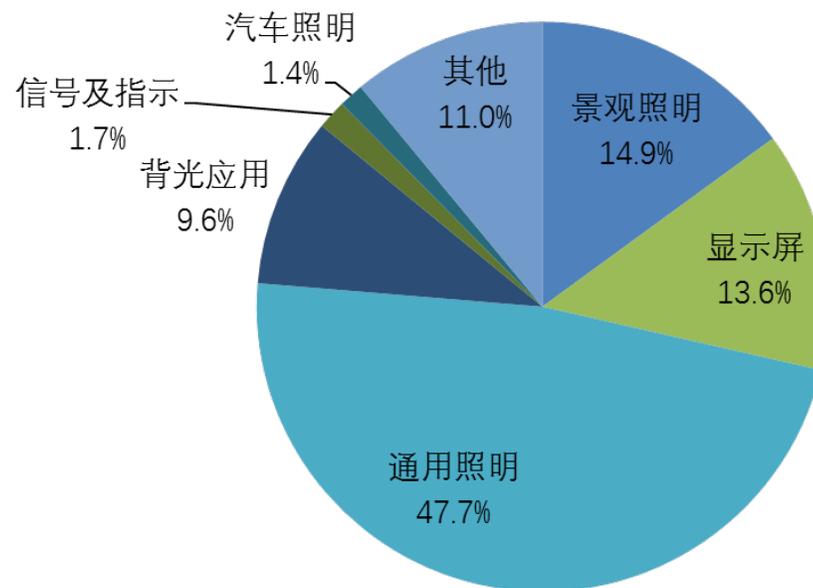
Data sources: CSA Research





# Industry scale breakthroughs 653 billion ¥

**LED industry in China 653 billion ¥ in 2017., year-on-year growth 25.3%;**



China 's LED lighting industry in 2006-2017 industry scale (100 million ¥)

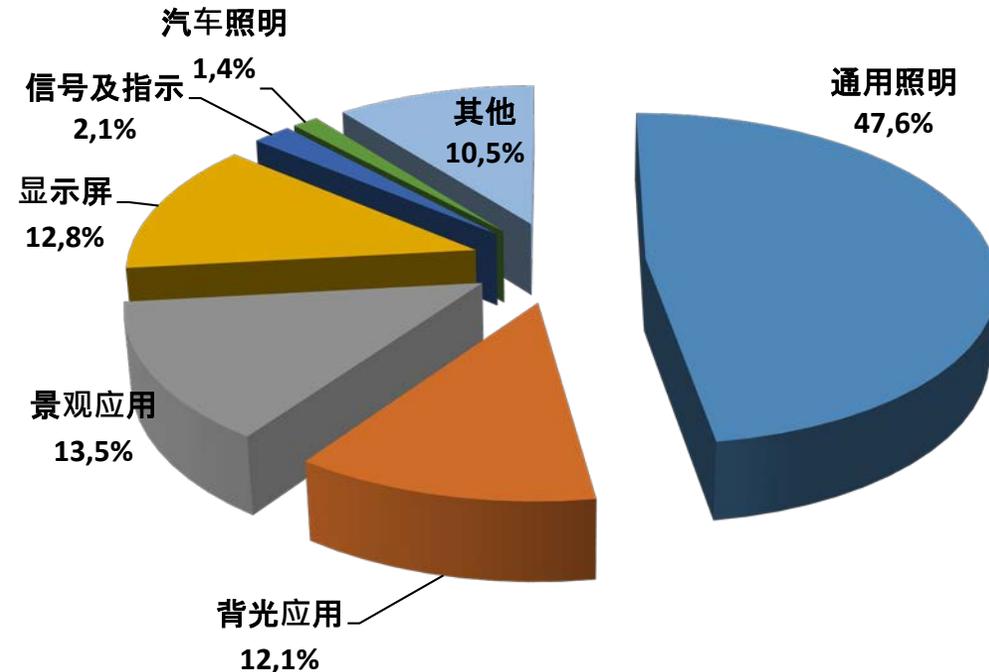
Data sources: CSA Research

**In 2017, LED general lighting output value 255 billion ¥, year-on-year growth 25%; LED display output value 72 billion ¥, year-on-year growth 33%; agriculture, automotive and medical lighting year-on-year growth exceeds 30%**



# Application areas gradually expanded

- LED general lighting is still the first driving force of the application market. The output value reached 294 billion ¥.
- Display applications continued to grow, with a scale of approximately 54.8 billion yuan, a year-on-year increase of 29%, accounting for 12.8% of the overall application market.
- Automotive lighting and beyond lighting applications have become the new Blue Ocean. In 2016, LED auto lighting grew at a high rate, with a year-on-year increase of 33.8%.
- Backlight application market growth is weak .

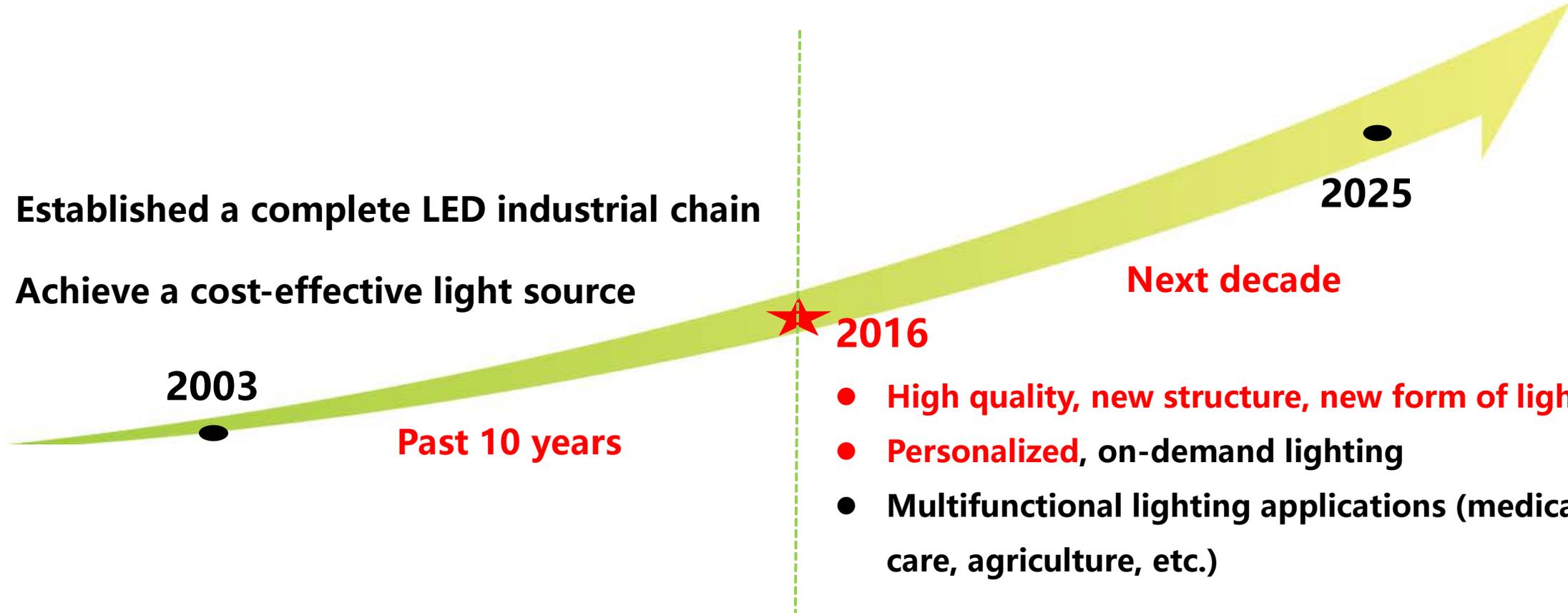


Distribution of Semiconductor Lighting Applications in China in 2016

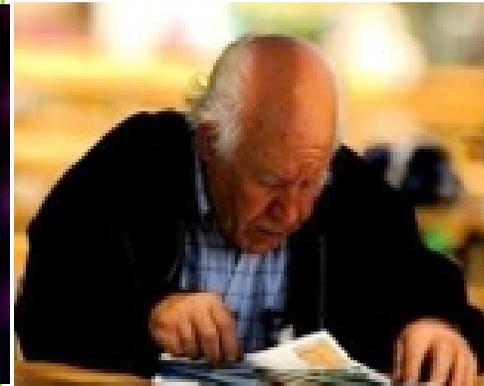
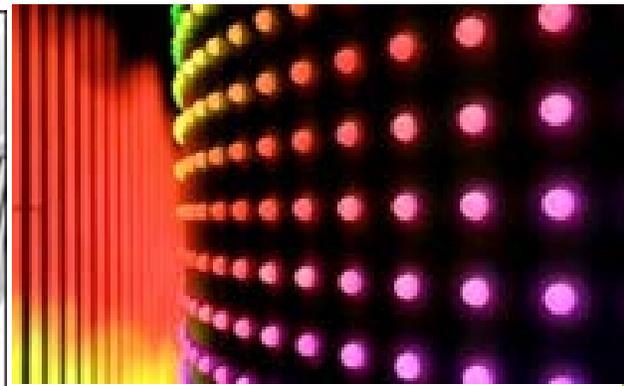
Data sources: CSA Research

# LED Industry development trends in China

- Established a complete LED industrial chain
- Achieve a cost-effective light source



- High quality, new structure, new form of lighting
- Personalized, on-demand lighting
- Multifunctional lighting applications (medical, health care, agriculture, etc.)



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**LED Industry Status in China**

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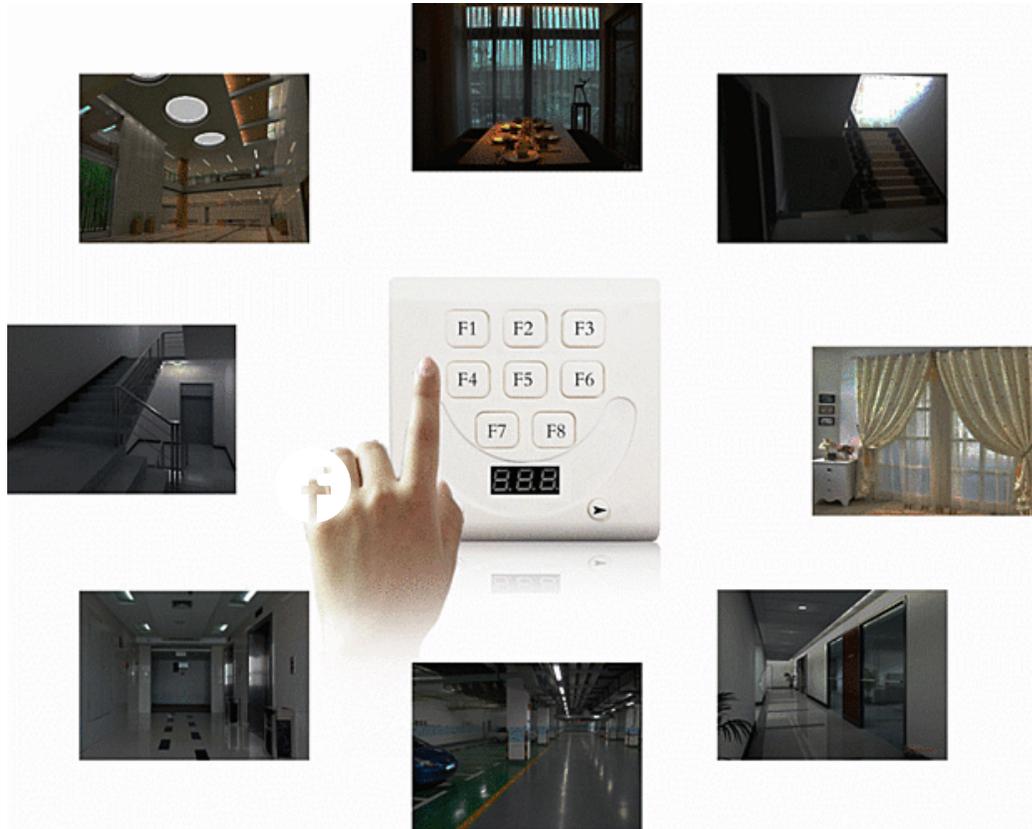
**Smart Lighting Development Trend**

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**State Key Laboratory of Solid State Lighting**

# The concept of smart lighting

Smart lighting is Providing a comfortable and reasonable lighting environment for a specific location at a specific time to achieve.



Intelligent Lighting

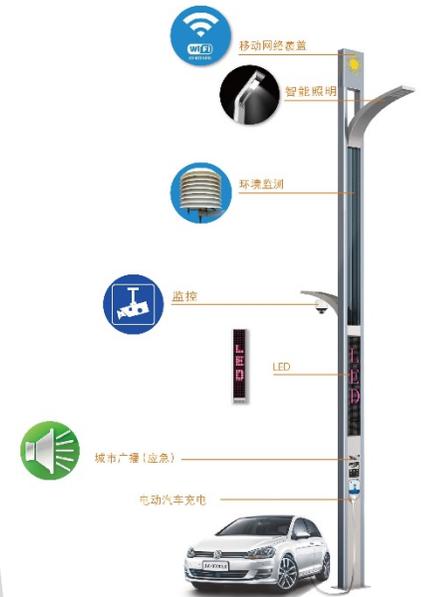
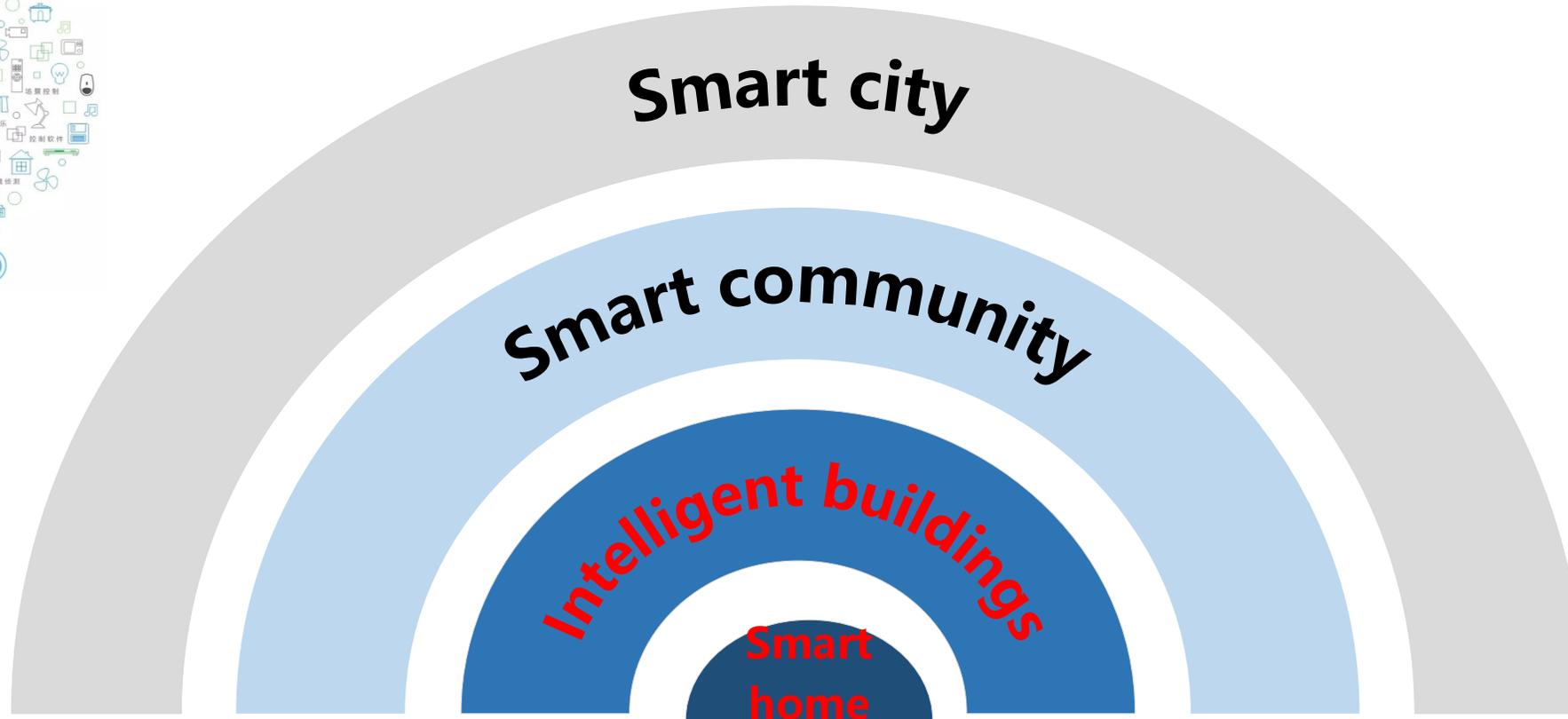
Smart Lighting

Adaptive Lighting

Using computer, wireless or wired communication, intelligent information processing and other technologies to achieve **intelligent control of lighting equipment**

# The important application of the IoT

Digital lighting, controllability, high efficiency, and long life of LED lighting products make smart lighting systems possible



LED intelligent lighting is one of the best ways to open **"Smart Life"**

# LED important development direction

Intelligent lighting control brings **high added value**

Transform LED lighting industry from product model to service model



**Cross-border cooperation**

**Added value boost**

**Market expansion**

**Industry model transformation**

Promote cooperation between LED companies and Internet companies

Intelligent control function enhances the market space of the enterprise

# Smart lighting key technology

## Dimming technology

- PWM Method for Brightness Control
- 16 million colors

Control was developed from the initial panel, remote control, and APP to voice and gesture control, and it was developed in the direction of artificial intelligence.



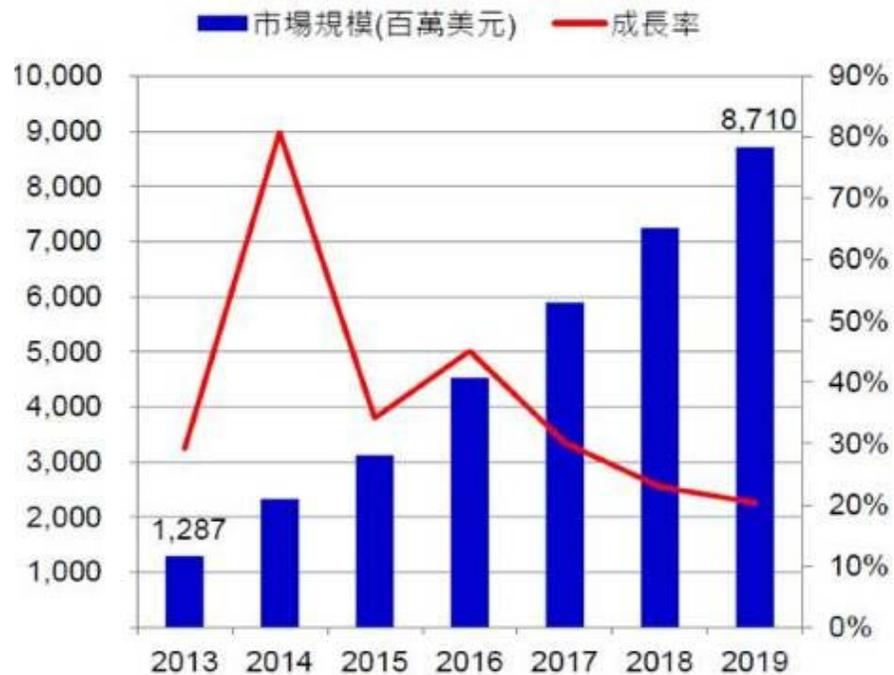
With the wide application of next-generation information technology such as big data and cloud computing, LED intelligent lighting products will become more “smart” as the entrance to the “Internet of things” .

- Current mainstream communication technologies include **wired communication** technologies such as KNX, DALI, C-bus, power carrier
- **wireless communication** technologies such as Wifi, **NB-IoT, LoRa, ZigBee, Bluetooth**, Z-wave, and Thread.

# Smart lighting - market penetration remains low

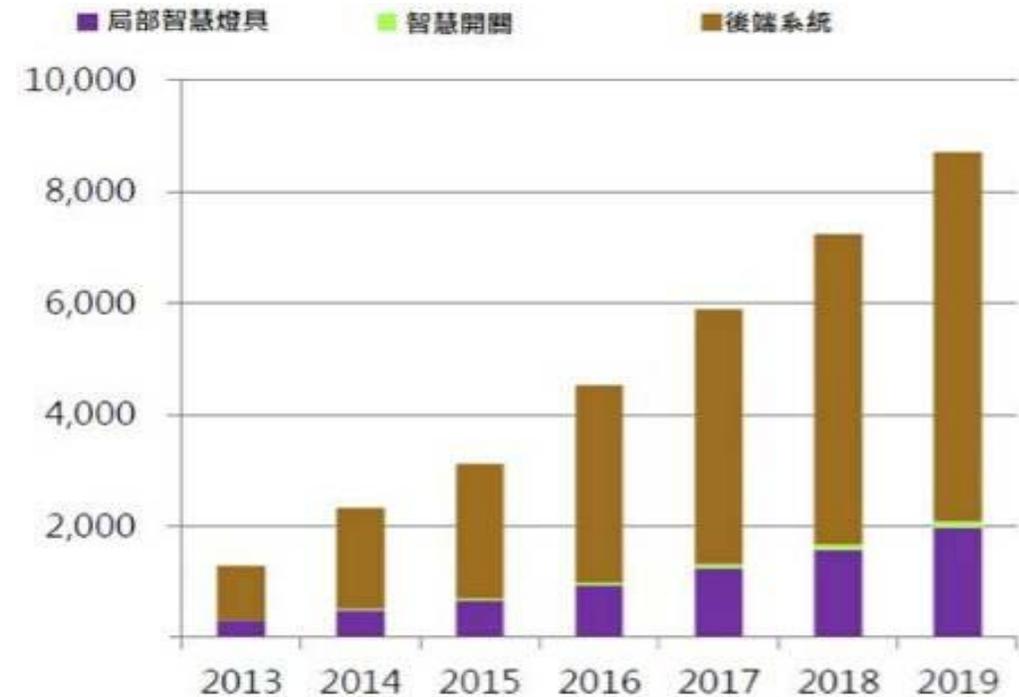


- According to NanoMarkets, the global smart lighting market is close to 6 billion \$ in 2017, and the market size is expected to reach 8.7 billion \$ by 2019.



2013-2019 Global Smart Lighting Market Scale

Data sources : NanoMarkets



Global smart lighting market output value (in millions of US dollars)

Data sources : NanoMarkets



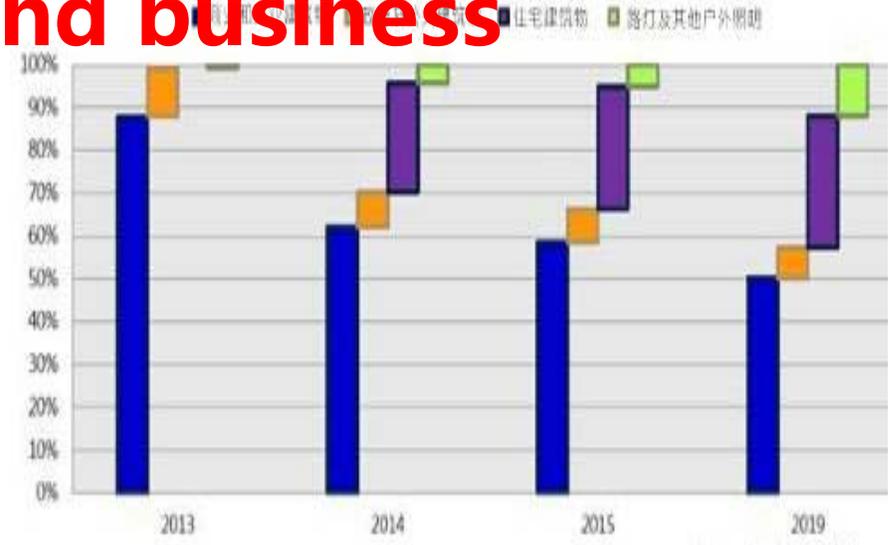
# Rapid development in the public domain, with different needs for home and business products

## Application area:

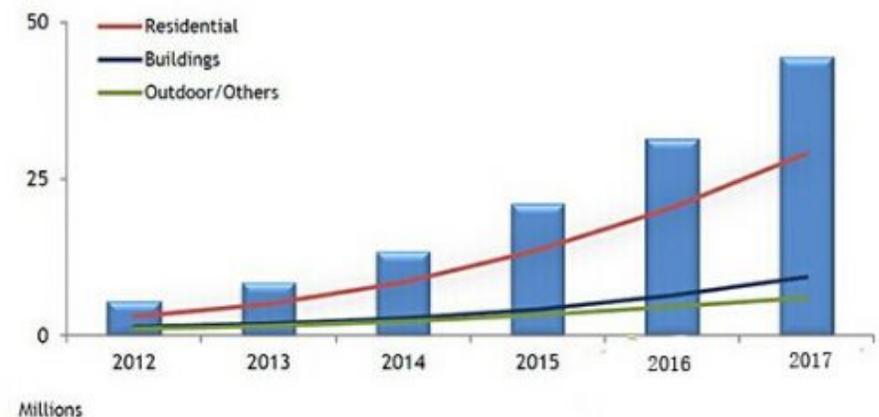
- **Public** lighting is the first area where smart lighting is used, especially **smart street lighting**
- **Industry and commerce** are still the largest application areas of intelligent lighting

## Product:

- It is estimated that by 2019, the global shipment of **LED smart light bulbs and lamps will reach 400 million**



The proportion of smart lighting applications in 2013-2019 Data sources: NanoMarkets



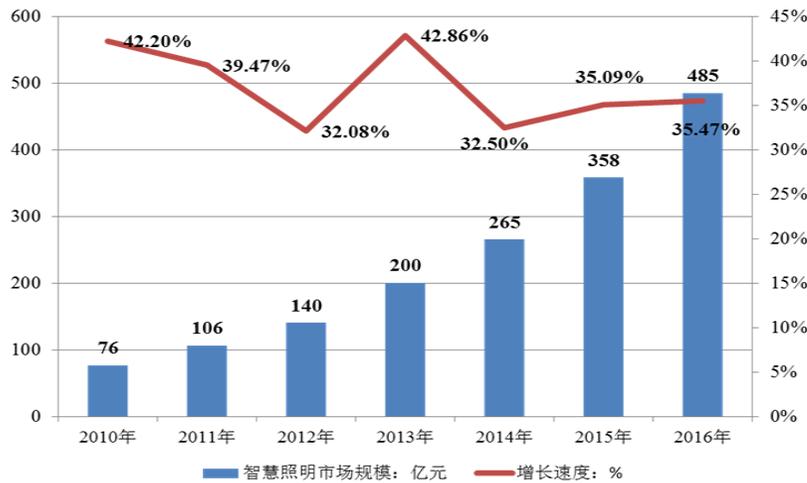
Wireless chip global shipments in lighting control in 2012-2017 Data sources: onworld



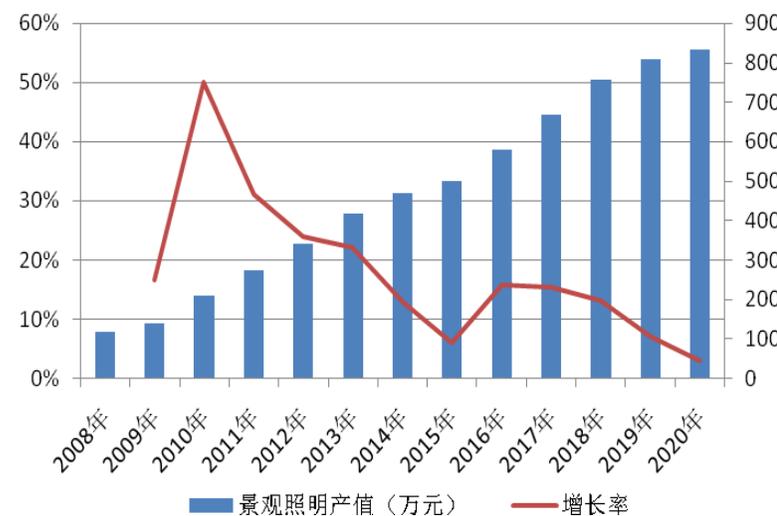
# Demand is huge in China

China 's LED general lighting output value was 204 billion ¥ in 2016, of which LED smart lighting output value was **about 2.5 billion ¥, only 1.2%** of total output value, mainly concentrated in the new street lamps and commercial landscape areas

- ✓ CSA Research expects that by 2020, **China 's LED smart street lamp market penetration will reach about 40%**, and the market size is expected to **exceed 10 billion ¥**; In 2016, the output value of landscape lighting in China will be close to 50 billion ¥, and it is expected to exceed 80 billion yuan in 2020.



China's Smart Lighting Market from 2010 to 2016 Data sources: CSA Research

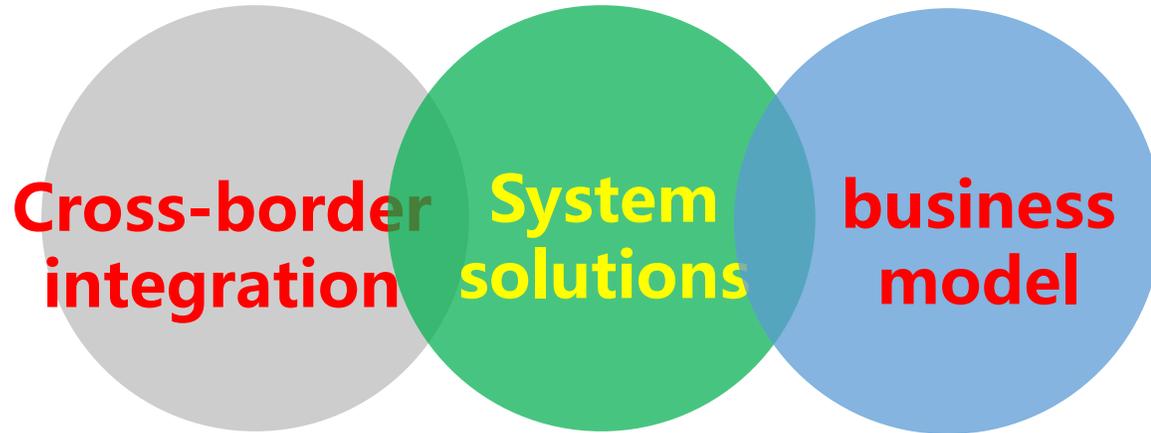


China's Landscape Lighting Output Value and Growth Rate Data sources: CSA Research



China Urban Road Lighting and Growth Rates from 2004 to 2015 Data sources: CSA Research

# Smart lighting Problems



At present, intelligent lighting products are still **in the single product stage and they are not systematic** and face many **problems.**

**01** Smart lighting will be **integrated with homes, transportation, building, health, energy, services, video, and communications.** Due to the different needs of different application areas, **there is currently a lack of targeted system solutions.**

**02** The enterprise has not yet realized the transition from providing intelligent hardware to providing value-added services.

# Smart Lighting Development Trends



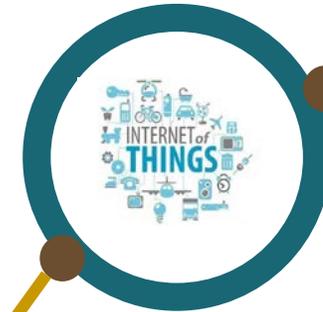
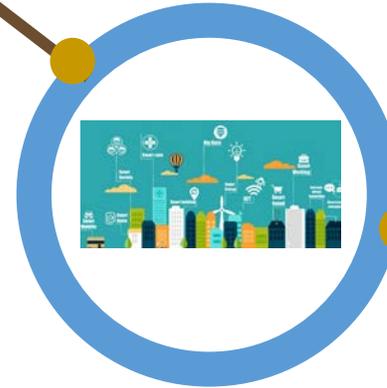
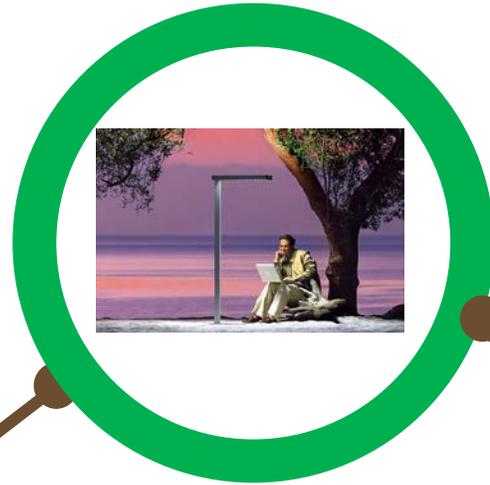
**people oriented**

**Healthy and comfortable lighting environment**



**Cross-border integration**

**More than just lighting**



**Effect oriented**

**Not only energy saving,**

**Changes according to needs**

**Model innovation**

**From product to service**



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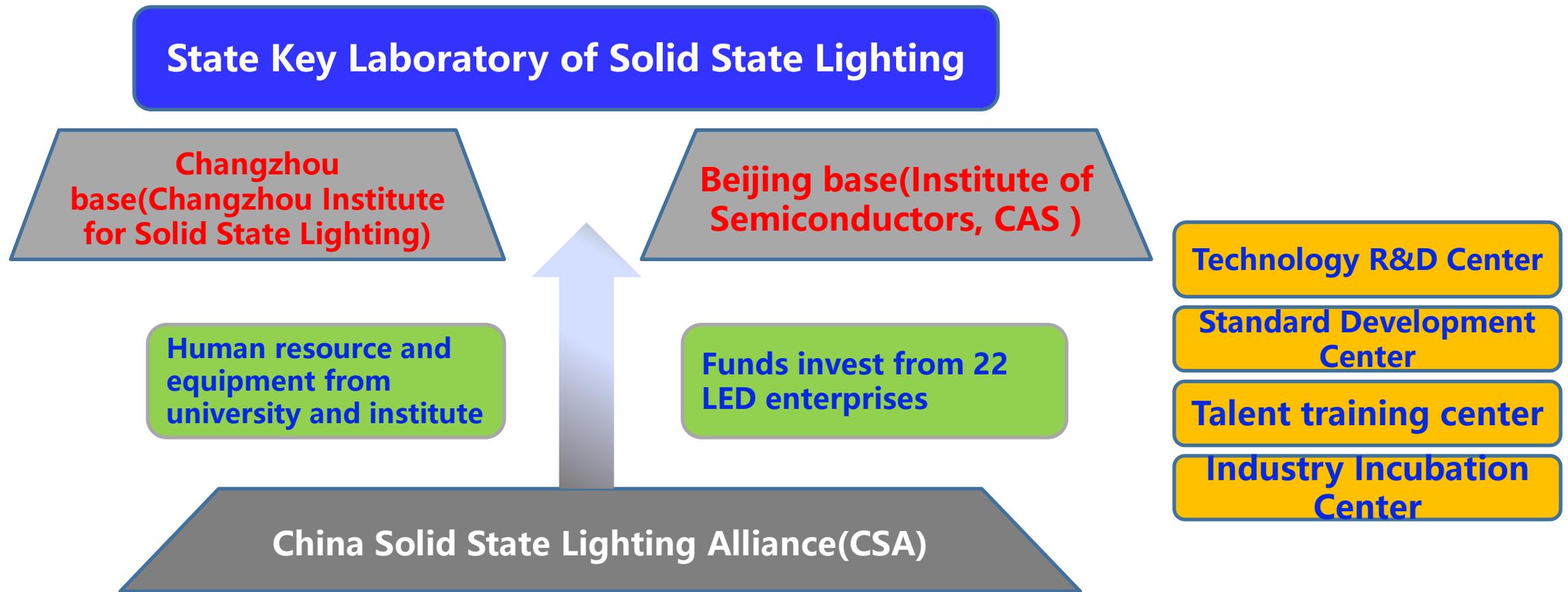
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Lighting**

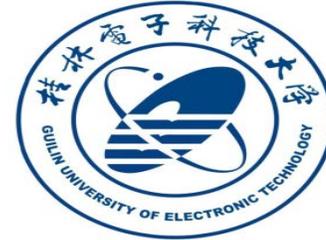
# Who are we?



- In January 2012, the Ministry of Science and Technology officially approved the establishment. The only state key laboratory that relies on alliance construction in China.
- May 18, 2012 officially started operations.
- On April 15, 2015, it passed the acceptance of the Ministry of Science and Technology;

# Established close cooperation with many domestic and foreign universities and research institutes.

## Partner



代尔夫特理工大学

Co-cultivation doctoral students



香港科技大学



# What we do?

## Business Diagram

Indoor & outdoor smart lighting  
ZigBee、lora, NB-IoT

Smart Lighting

LED Standard

Released 18 LED industry standards, two of which were upgraded to national standards

CSA/CIES  
国家半导体照明工程研发及产业联盟标准  
中国照明学会团体标准  
TCSA-05-2014/CIES-05-2017

基于窄带物联网（NB-IoT）的道路照明智能控制系统技术规范  
Technical specification for smart control system of road lighting based on Narrow Band Internet of Things (NB-IoT)  
版本：V01.00

2018-05-18 发布  
2018-05-18 实施  
国家半导体照明工程研发及产业联盟  
中国照明学会 发布



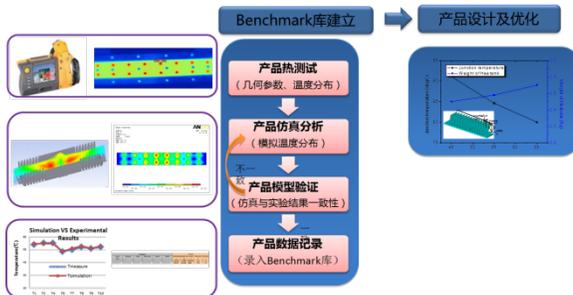
Acquired CNAS and CMA qualifications, Qualified to issue a report of the results to the community



Reliability simulation, testing

Reliability

Testing Lab



Welcome cooperation

THANKS

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Lord of light  
江苏 无锡



扫一扫上面的二维码图案，加我微信

