



## PV Smart Energy Solution Provider



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Yingli Energy Development Co., Ltd.



# A leading global provider of smart PV energy solutions



5

National scientific research platforms



10<sup>+</sup>

More than 10 production and service bases



10 years

An industry leader in national patent applications for 10 consecutive years



>30GW

Cumulative shipment > 30GW

>100

Products distributed in more than 100 countries and regions around the world

## Introduction

Yingli Solar, among the earliest Chinese enterprises that engage in the photovoltaic sector, has now developed into a provider of smart photovoltaic energy solutions which focuses on R&D, intelligent manufacturing, and power plant development & operations. Yingli Solar has been engaged in the PV industry for 24 years, with over 30GW products available in more than 100 countries and regions across the world.

Headquartered in Baoding, Hebei Province, Yingli Solar has set up smart manufacturing bases in Baoding, Tianjin, Hengshui, etc. and introduced domestically and internationally advanced instruments and equipment, making its entire production process intelligent, automated, precise and efficient.

Yingli Solar has always highly valued independent R&D and technological innovation. It boasts several national research platforms and PV technology laboratories and has long been an industry leader with regard to the number of patents. Yingli Solar is striving for massive exploitation and utilization of green solar energy through the state-of-the-art technologies, and is committed to achieving the carbon peaking and carbon neutrality goals through photovoltaic development.

Yingli Solar has been focusing on



high-efficiency cells and modules

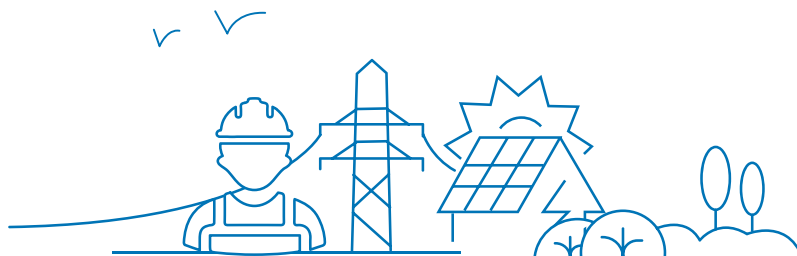


power plant operations





# HIGHLIGHTS



# 1998

## The pioneer in the PV industry

### 1998

Started its engagement in the PV industry and became one of the earliest PV companies in China

### 1999

Undertook a 3MW/year national demonstration project of polysilicon solar cells and application systems, marking a start of PV industrialization in China

### 2003

Produced China's first polysilicon ingot

### 2005

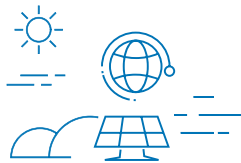
Participated in the Seminar on the Implementation of the Renewable Energy Law and organized activities to popularize the Law, to facilitate the development of the PV industry

### 2007

Went public on the New York Stock Exchange in the USA, thus entering the capital market officially

### 2009

- Became the first Chinese PV company to join the PVCYCLE
- Pioneered the development of n-type technology and named it "PANDA"
- Cumulative 1GW shipments



## A global leader in the production and application of n-type products

### 2010

- Became the first PV company and the first Chinese company to sponsor the 2010 FIFA World Cup South Africa™
- Approved to be a "national key laboratory of PV materials and technologies"
- Achieved the production throughout the industrial chain from pulling, slicing, cell production to module production, as China's first n-type high-efficiency monocrystalline cell manufacturer

### 2011

Approved to be a "national key laboratory of PV energy technology"

### 2012

- PANDA modules secured the second place in TÜV Rheinland's global "PV module power test"
- Became the world's first PV company with TÜV Rheinland's carbon footprint certification

### 2013

Ranked first in the world with 3.2GW shipments of PV module

### 2014

- Continued to sponsor the 2014 FIFA World Cup Brazil™, making "Yingli Solar" shine on World Cup
- Listed among the top 3 in China brand awareness survey by TNS Emnid



## A pacesetter for PV innovation through continuous devotion

### 2015

- Supported the Belt and Road strategy and facilitated the launch of the first China-EU PV train
- Awarded the title of "5-star Module of Rheinland Star"

### 2016

- Provided 50MW PANDA products to the demonstration project under the Top Runner Program in Datong, Shanxi, to build the world' largest bifacial power plant at that time and guide the large-scale application of bifacial products
- Played a leading role in developing the first clean production evaluation index system of the PV industry

### 2018

- Approved to be a "national technical standard innovation base (PV)"
- Enabled its PANDA modules to be the industry's first product accredited by China's CGC, the USA's UL and German TÜV Rheinland

### 2019

Won the 2019 high achiever award in quality in PV module from RETC

### 2020

Provided 117MW n-type PANDA products for the largest bifacial power plant in the Middle East

### 2021

- Worked together with Huawei and North China Electric Power University to set up the Huawei Baoding New Energy Power Joint Innovation Lab
- Entered a new stage of development



## A global leader through strategic upgrade

### 2022

- Ranked among Bloomberg New Energy Finance's tier-1 PV module manufacturers
- Won the Overall High Achievement in Performance from RETC and became one of the world's top six

# 2022





# GLOBAL PRESENCE AND PROFESSIONAL SERVICES

Owing to its global integrated service network, Yingli Solar can provide customers with timely and accurate services in an all-round manner and strengthen cooperation with key customers. It has branches and offices in Europe, Oceania, North America, Latin America and Asia. Such local service teams and after-sales service centers around the world can respond quickly to customer needs within 48 hours.

## 4 intelligent manufacturing bases

Tianjin



Lixian, Hebei



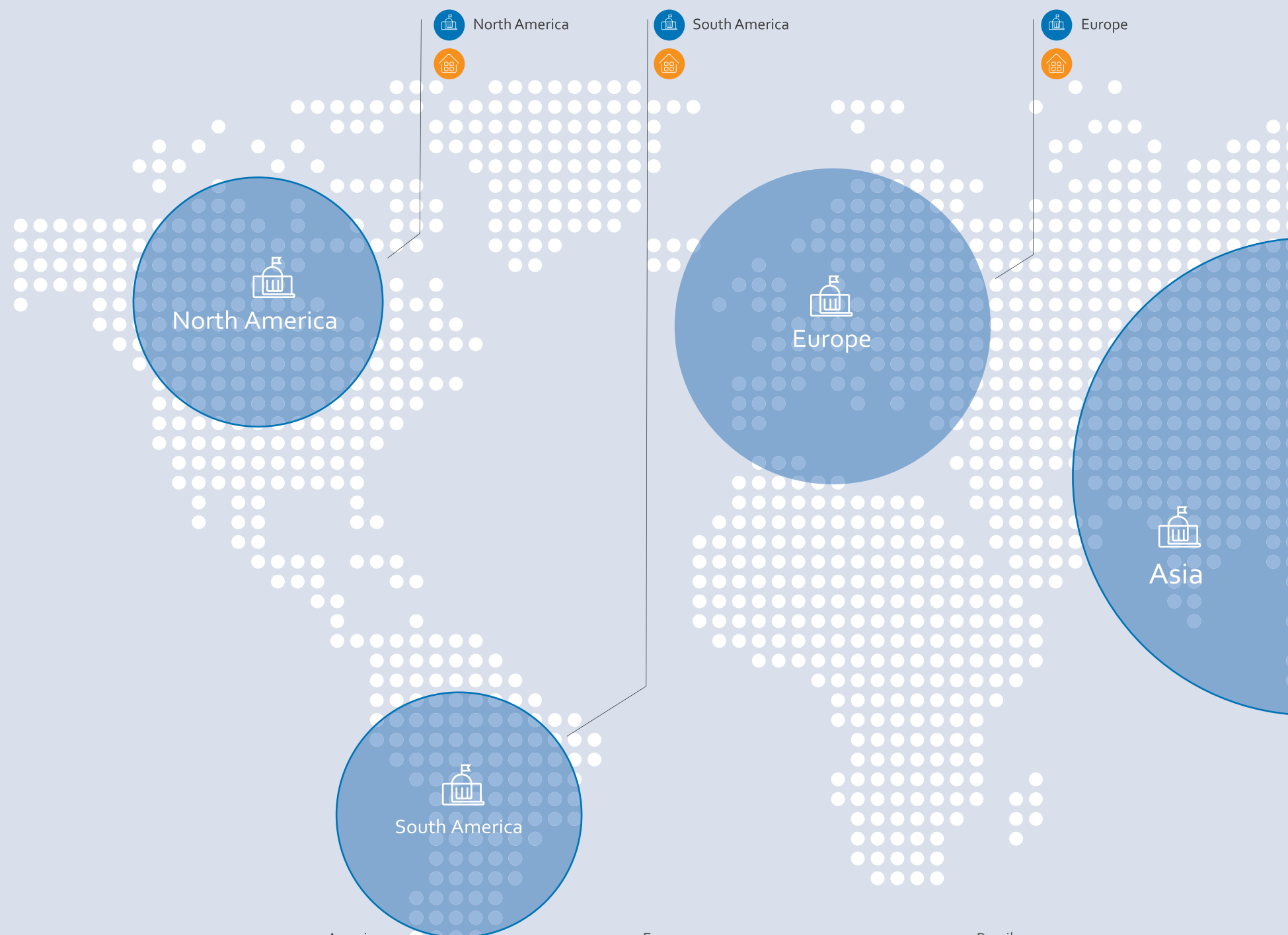
Hengshui, Hebei



Mancheng, Hebei



## 5 Satellite factories



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**48h**

Quickly respond to customer needs

**30GW+**Its PV modules are working around  
the world**100+**

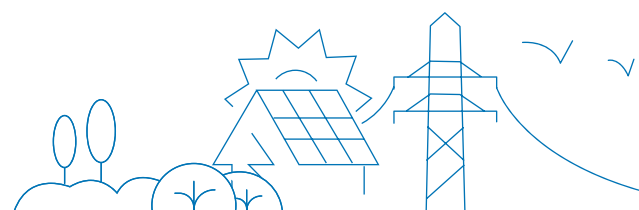
Countries and regions covered



## Innovative in Science and Technology

Relying on its national research platforms, academician workstation, and post-doctoral workstation, Yingli Solar has made continuous efforts in independent innovation to sharpen its core competitiveness.

Yingli Solar is named National Technical Standard Innovation Base (PV), which is the only of its kind at the national level in China's PV industry. As the leader, it has developed China's first bifacial PV power generation standard and the industry's first clean production evaluation index system, which play a crucial role in enhancing the voice and competitiveness of China's PV technology.

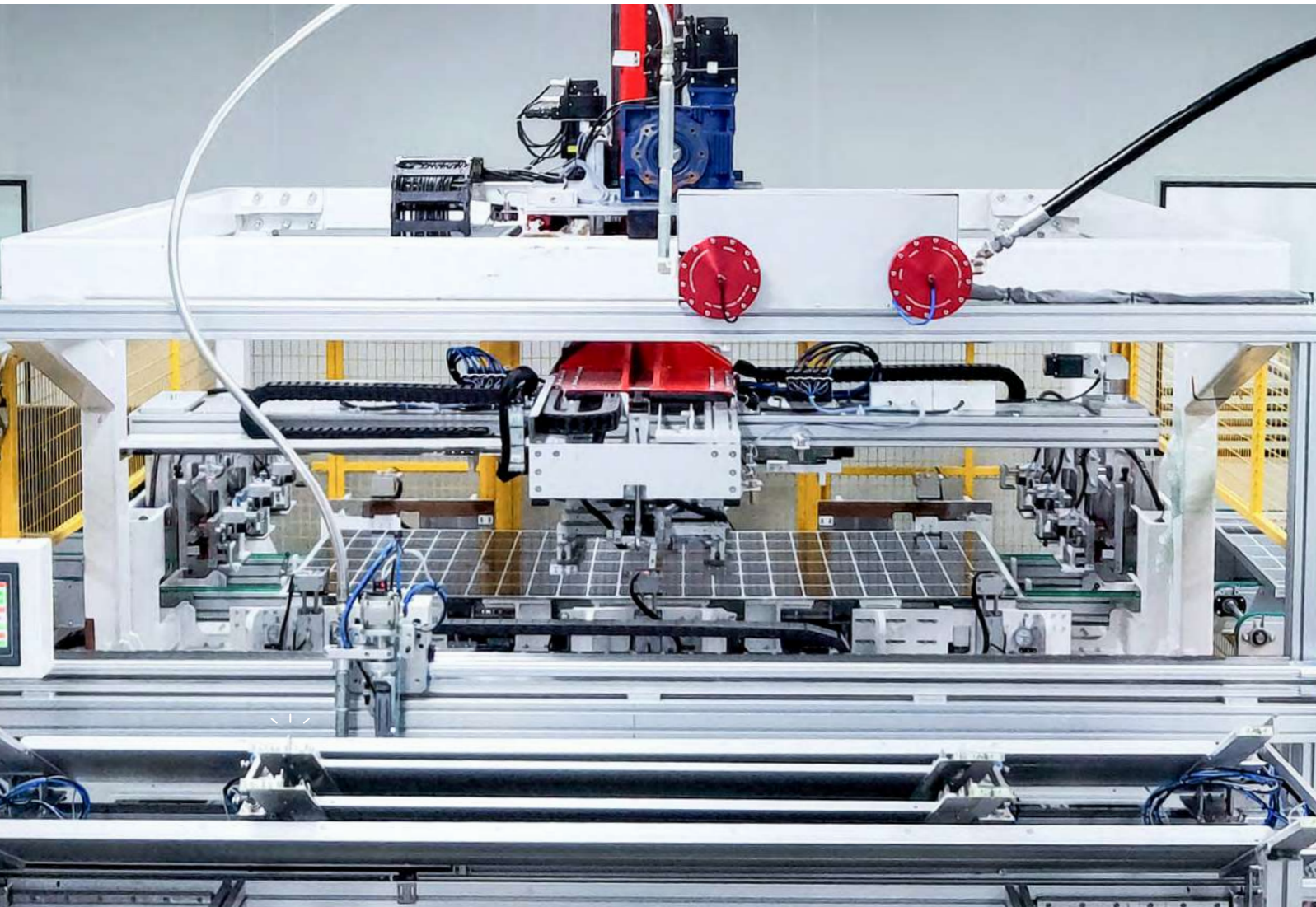


# 118

Presided over and participated in the compilation of 118 Chinese and international standards.

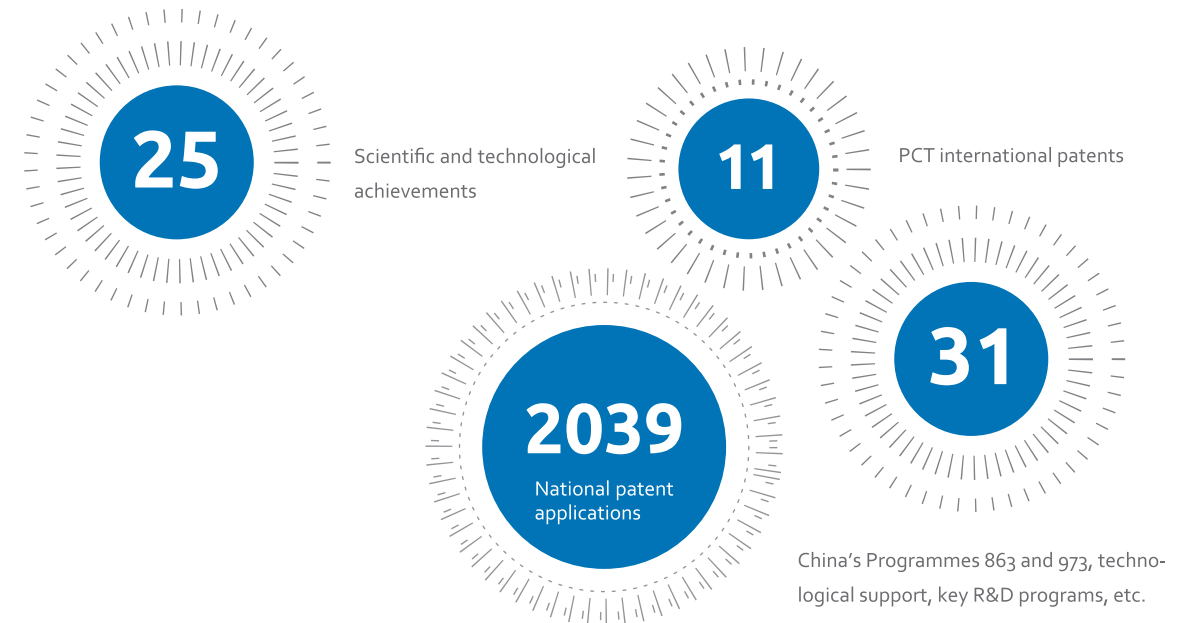






## Strength in scientific research

Yingli Solar has continued to make heavy investment in R&D and innovation, introduce and train research talents in relevant high-end industries, for a further exploration of R&D. Yingli PV technology laboratories have been accredited by China National Accreditation Service for Conformity Assessment (CNAS), China General Certification Center (CGC) and Shanghai Dekra Quality Certification. There are more than 150 sets of instruments and equipment which are advanced both domestically and internationally in these laboratories, with a total investment of 120 million Yuan. This enables the company to test over 200 items related to the whole industry chain ranging from silicon wafers, cells, modules to power plants while meeting the requirements of many international standards, including IEC61215 and IEC61730.



## Leading-edge technologies make Yingli Solar more competitive

### Independent R&D

Yingli has ranked first in the industry in terms of the number of patent applications and authorizations for 10 consecutive years, and ranks 266th among Top 500 Chinese patentees. Yingli Solar gained such titles as "National Intellectual Property Demonstration Enterprise", "Pilot Enterprise of Intellectual Property Application of Advanced Collective Industrial Enterprises in the Implementation of National Intellectual Property Strategy".

### Industry-academia-research Cooperation

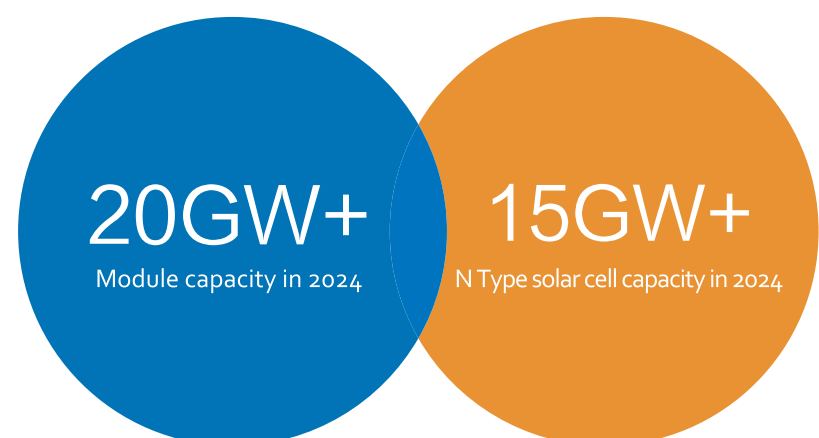
Yingli Solar has entered into long-term cooperation with over 20 top universities and research institutes across the world to build interactive and mutually beneficial high-level industry-academia-research cooperation carriers. Its PV module products represent the highest level of the industry.





## Intelligent manufacturing

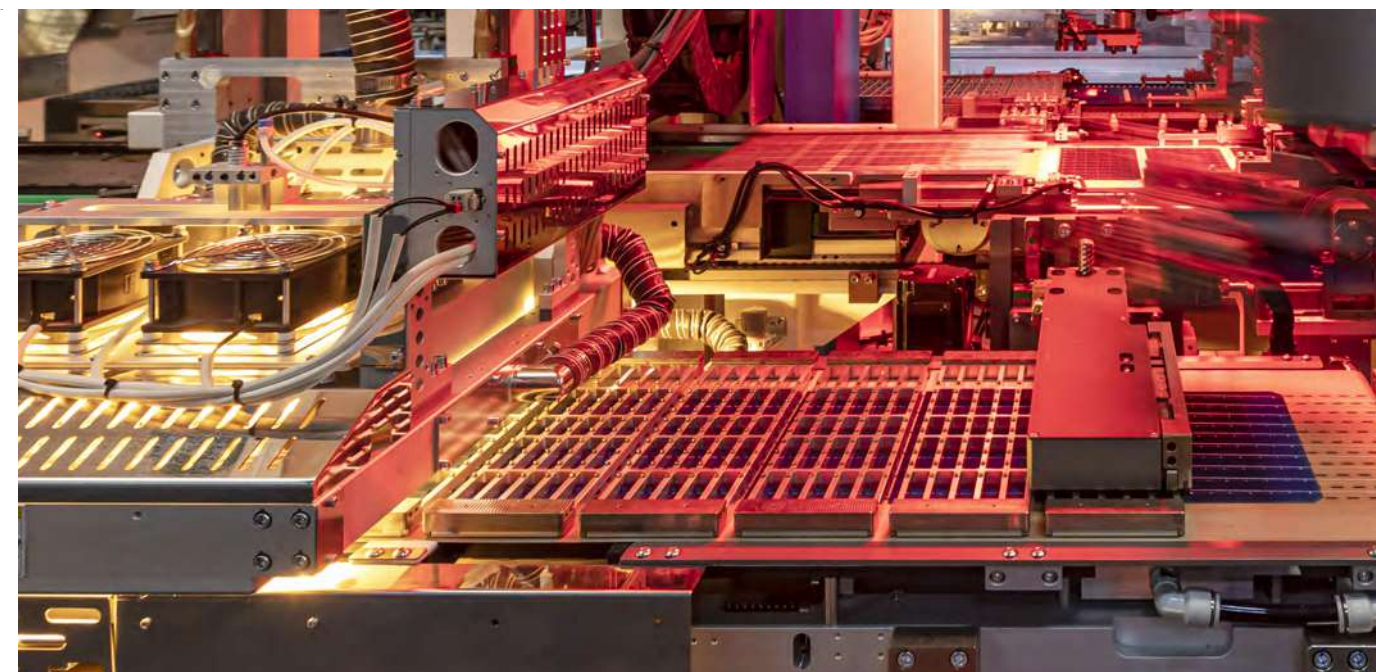
With the industry-leading equipment and technology, Yingli Solar has achieved a high degree of automation in manufacturing management, quality management and energy management of its industrial bases, and formed intelligent interconnection and digital operation of production lines and equipment. Moreover, Yingli has production lines that apply internationally leading technology, and as a result, an intelligent industrial park towards low-carbon, green and intelligent manufacturing has taken shape.



Labor efficiency up  
**30%**

Management efficiency up  
**100%**

Module conversion efficiency  
**22%**



## Three management systems form a closed loop of intelligent manufacturing





## PANDA technology

**panda**



### The first batch of foregoers in China

To make R&D and mass production of n-type cells



### The world's first bifacial product supplier

Accredited by CGC, UL and TÜV



### The world's first company

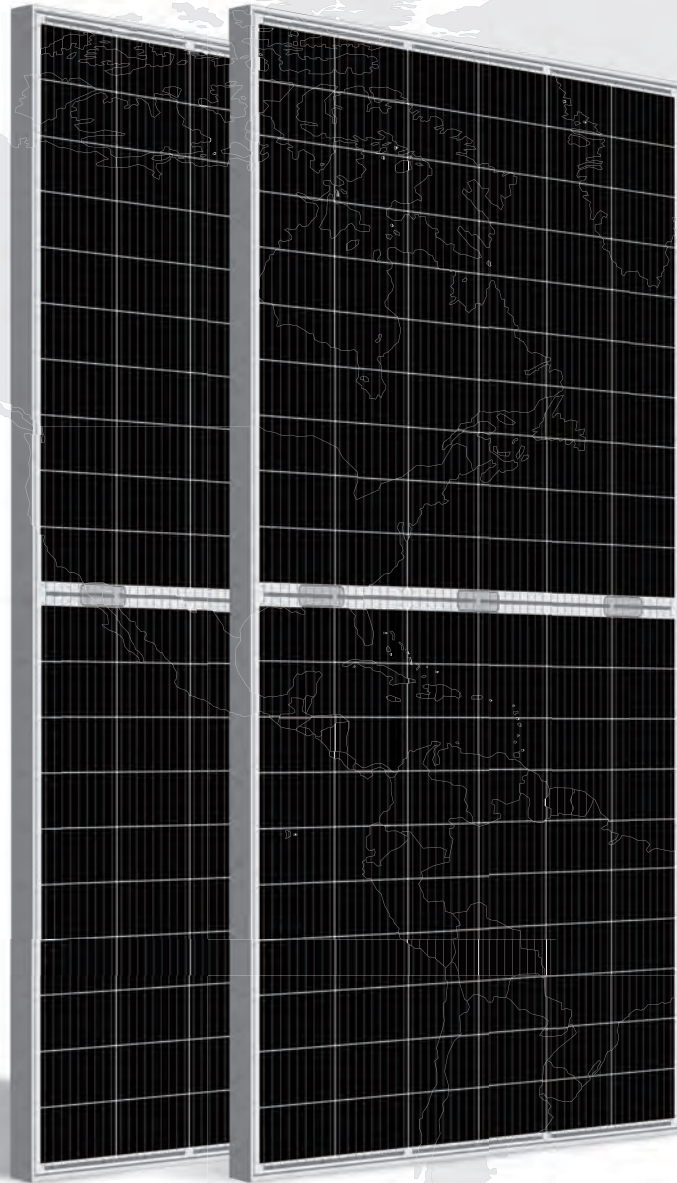
To make large-scale application of power generation technology of Bifacial N-Mono Module



### The industry's first test standard

For bifacial power generation

As a pioneer in developing and producing the first batch of n-type cells in China, Yingli Solar is the first company to achieve large-scale application of PANDA Bifacial N-Mono Module products by using its self-developed core technology and national-level laboratories with the support of the 863 Program, 973 Program and other national key scientific research programs. As a result, the first testing standard is then established. Yingli's continued efforts to increase the power generation of n-type cells and reduce the LCOE have made it possible to apply n-type cells in diverse climates nearly everywhere in the world.



Able to perform in diverse complex climates and environments

### Utility power plant project under the Top Runner Program in Datong

The first bifacial power plant project under the Top Runner Program  
The world's largest application project of high-efficiency bifacial N-mono module

### Ibri II utility power plant project in Oman

Significant reduction in LCOE in the high-temperature desert

### Fishery and PV power plant project in Zhejiang

Full absorption of the reflections on the water surface for power generation in humid subtropical areas

### Multi-energy hybrid power plant project on Nansha Islands

Stable operation under high temperature, high humidity, high salt spray and high load



## HIGHER ENERGY YIELD

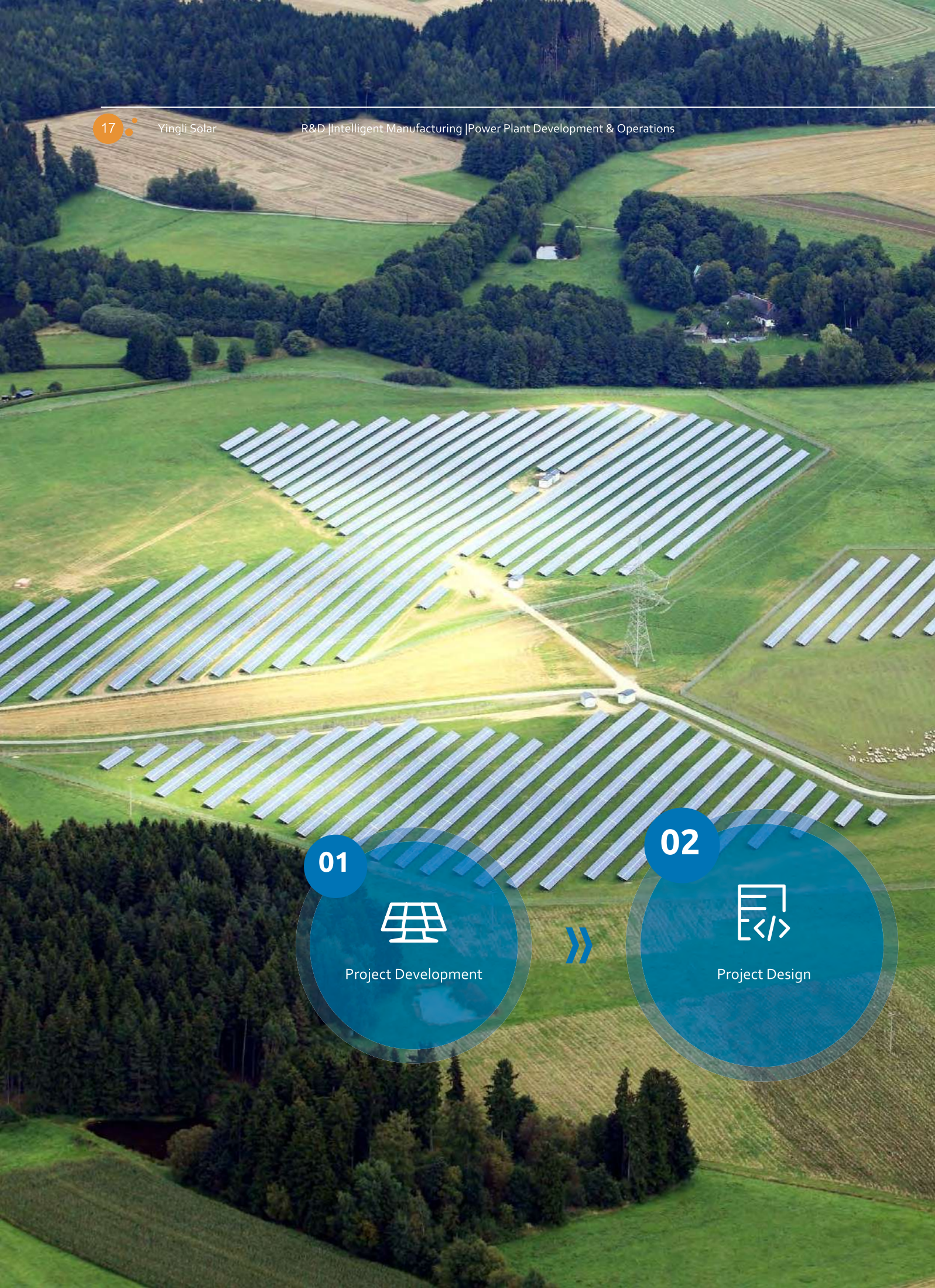
- Outstanding Bifaciality
- Good low light performance
- low light induced degradation
- Good temperature coefficient

## LOWER LCOE

## BETTER ENVIRONMENTAL ADAPTABILITY

Makes the modules even more resistant to snow loads, low temperatures, humidity and heat, and salt mist corrosion





01



Project Development



02



Project Design



03



Construction



04



Assets Management

## Power plant development and construction

With the business development model integrating "innovation, technology, industry and service", Yingli Solar is committed to providing its clients with industry-leading integrated solutions for clean energy, that is, one-stop efficient services.

In the future, Yingli Solar will seize the opportunity of the green transformation of global energy structure, stay innovation-driven, and focus on the development of clean energy, to actively build a green energy system, and thus to contribute to China's goal of carbon neutrality.



Large and medium-sized utility PV power plants



Industrial and commercial flat rooftops



County-wide distribution



Fishery and PV power plant



Agri-PV power plant



PV + Application Scenarios



Integrated solutions for clean energy



## Efforts in carbon neutrality



### A Chinese brand with global reputation

The Company sponsored 2010 and 2014 FIFA World Cups, aiming to promote the concept of clean energy on international platforms.



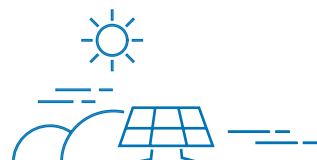
### Making PV power more valuable for a shared green future

Yingli Solar has made positive efforts in carbon neutrality. It took the lead in releasing the White Paper on "Carbon Neutrality" Action Plan, announcing its carbon neutrality goal and action plan. Moreover, it joined hands with nearly 100 enterprises in the new energy industry chain to release the Green Supply Chain Initiative for "Carbon Neutrality".



### Lighting up people's life through PV power

Since its inception, Yingli Solar has been living up to its social responsibility and commitment. It has been working hard to boost environmental protection and bring a more promising future through PV power.





Utility PV power plants

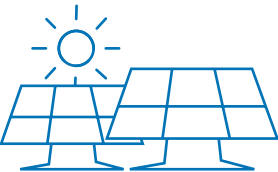
Bifacial project of national advanced PV technology demonstration base in coal mining subsidence area

Project Capacity: 50MW  
Location: Datong, Shanxi

Internet + Smart energy demonstration project in Zhangbei

Project Capacity: 240MW  
Location: Zhangbei, Hebei

- 1 Power plants in Malaysia
- 2 Utility power plants in Germany
- 3 Bifacial project of national advanced PV technology demonstration base in coal mining subsidence area
- 4 "Internet + Smart energy" demonstration project in Zhangbei





## Utility PV power plants

### Power plants in Algeria

Project Capacity: 233MW  
Location: Algeria

### Bifacial power plants in Oman

Project Capacity: 117MW  
Location: Oman

- ① Power plants in Ecuador
- ② Power plants in Algeria
- ③ Power plants in French
- ④ Power plants in Japan
- ⑤ Bifacial power plants in Oman







Utility PV power plants

Power plants in Mora,Portugal  
Project Capacity: 46MW  
Location: Portugal

- 1 Power plants in Mora,Portugal
- 2 Power plants in Youyu,Shanxi
- 3 Power plants in Germany
- 4 Power plants in Japan





# Commercial projects

Great Wall Factory  
Project Capacity: 45MW  
Location: China

IKEA,Switzerland  
Project Capacity: 300kW  
Location: Switzerland

- 1 Great Wall Factory
- 2 IKEA,Switzerland
- 3 Antwerp
- 4 Anaheim Exhibition Center

1



2



3



4

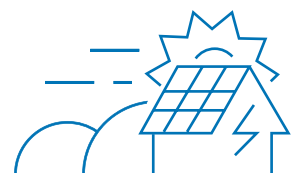


## Commercial projects

### Rio de Janeiro

Project Capacity: 390kW  
Location: Brazil

- 1 Rio de Janeiro
- 2 Commercial projects in Switzerland
- 3 Commercial projects in Japan
- 4 Commercial projects in Costa Rica





## PV Distributed and Integration Projects

### Shanghai Hongqiao

Project Capacity: 6.7kW  
Location: Shanghai

- 1 PV distributed projects in French
- 2 PV distributed projects in El Salvador
- 3 Shanghai Hongqiao



### 4 PV+Electric Heating systems

In order to optimize the energy structure, continuously improve air quality and improve clean heating, Yingli Solar installed 36.275MW PV+Electric Heating Systems for 7153 households in 38 villages in four counties of Baoding.





# PV Distributed and Integration Projects

## Xiongan train station

Project Capacity: 6MW  
Location: Xiongan

- 1 Xiongan train station
- 2 PV distributed projects in Germany
- 3 Independent system in Maldives
- 4 Guangxi Solar Agriculture
- 5 PV distributed projects in Singapore
- 6 Floating power plants in Switzerland
- 7 Sierra Leone College
- 8 PV distributed projects in Malaysia
- 9 Guangxi Solar Agriculture





