



**GCL New Energy Holdings Limited**



# Solar and Climate Policy in China

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Bringing Green Power to Life

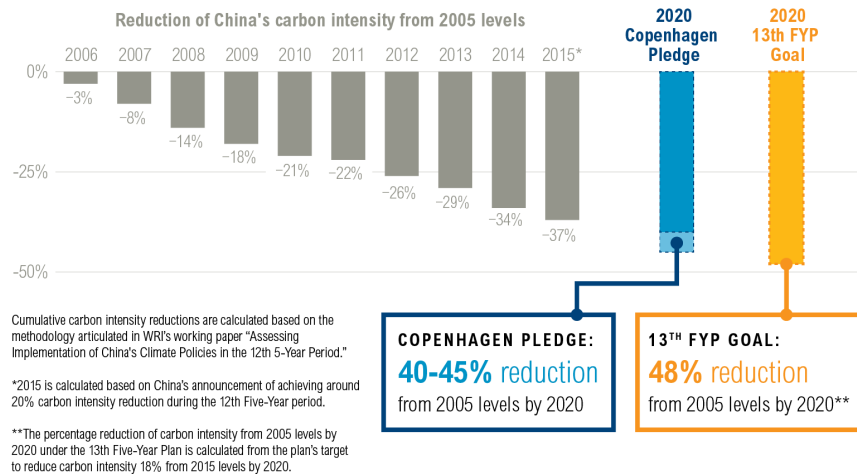


## Presentation Summary

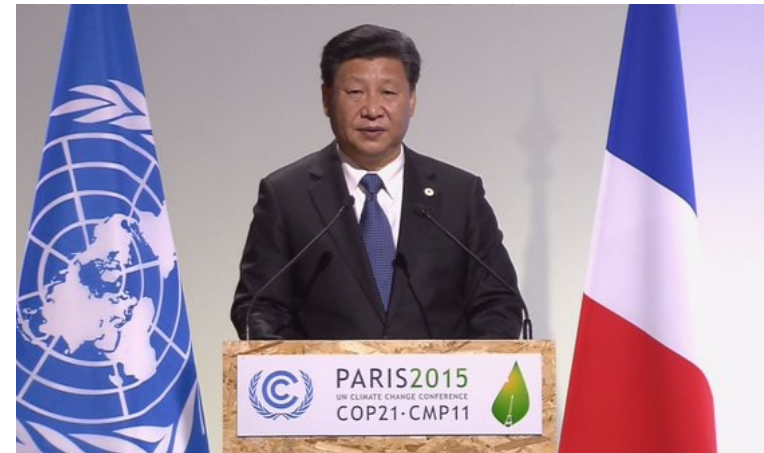
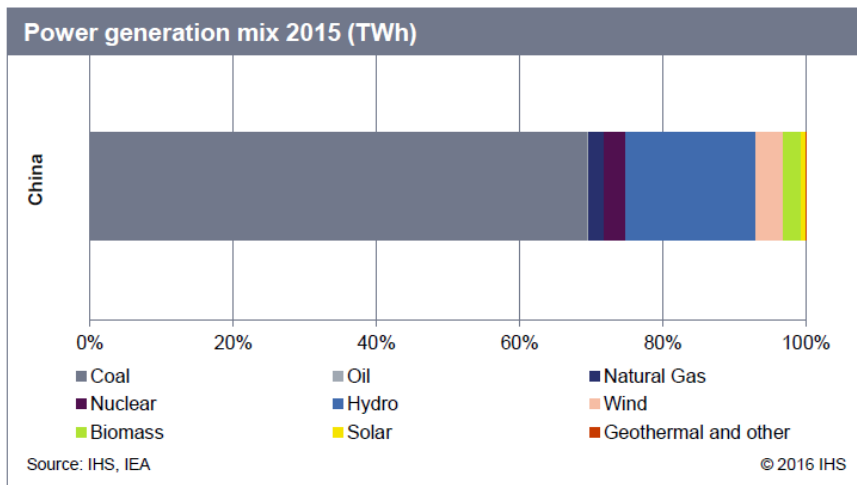
- China's climate goals
- China will lead in global solar installations through 2020
- Top global solar companies and countries
- China's challenge: solar in the west, population in the east
- China solar policy overview
- Feed in Tariff
- Top Runner Program
- Solar Poverty Alleviation Program

# China's Climate Goals

With 13th Five-Year Plan, China Sets Stronger 2020 Carbon Intensity Target



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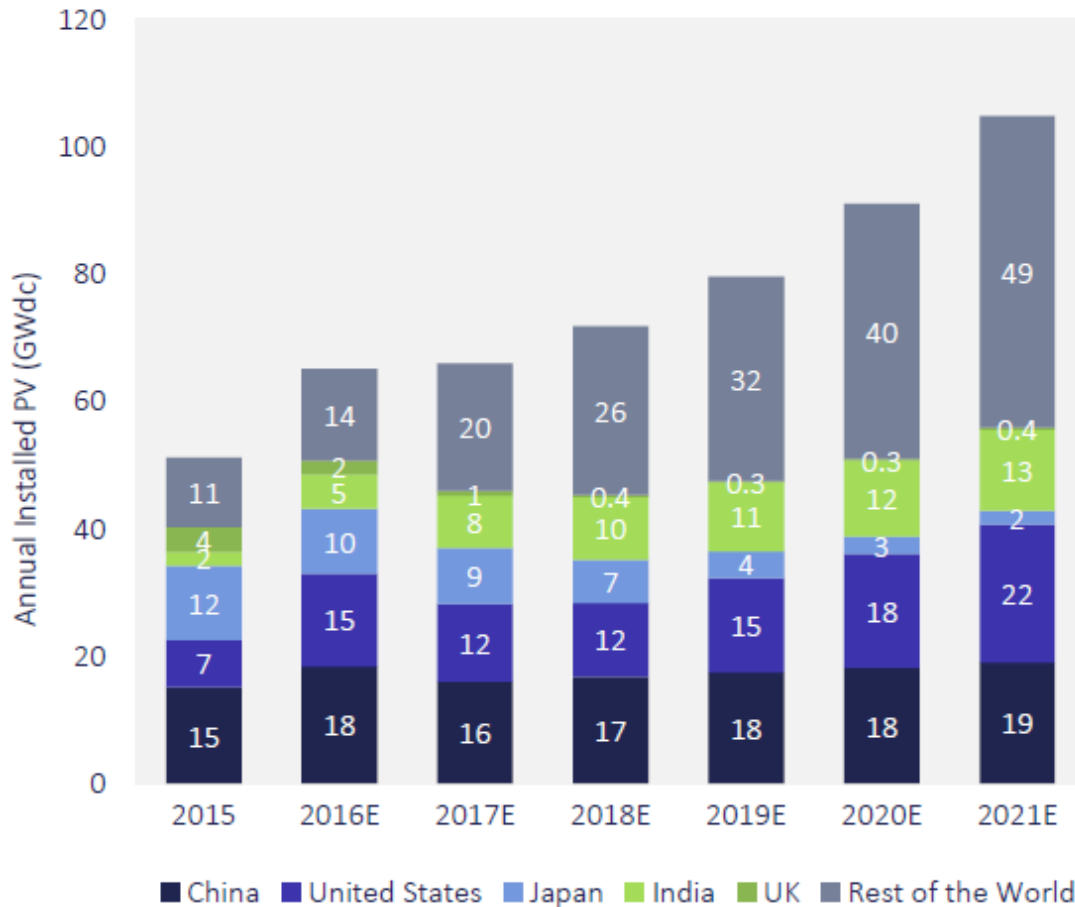


- GHG emissions peak by 2030, with efforts to peak earlier
- 20% by 2030 of energy consumption from non-fossil sources
  - Will require installation of 800 – 1,000 GW of non-fossil capacity, equivalent to total current US generation capacity
- National cap and trade system to launch in 2017 to be the world's largest
- \$3 billion to the South-South Climate Cooperation Fund for developing countries
- China on track to exceed its pledge in Copenhagen to reduce carbon intensity 40-45% below 2005 levels by 2020
- Paris pledge was 60-65% reduction in carbon intensity by 2030
- Installed 40% of the world's new renewable energy capacity in past 5 years



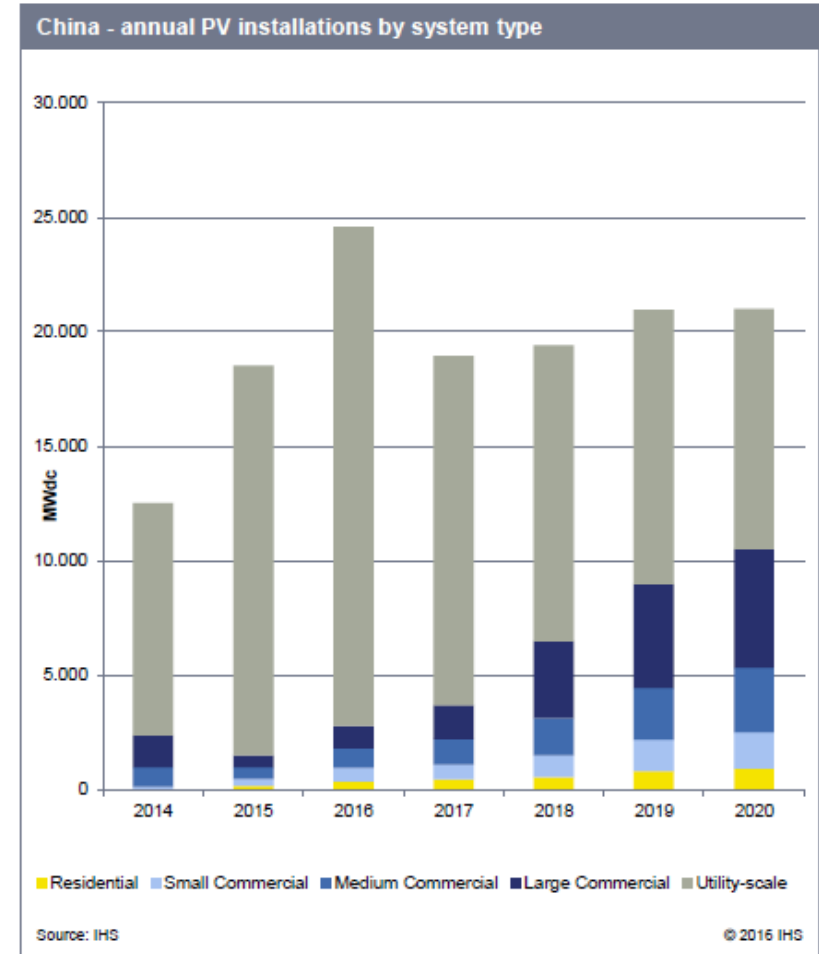
# China Will Lead in Global Solar Installations through 2020

## Solar Installation Forecast: Top 5 Global Markets



Source: GTM Research Global Solar Demand Monitor Report

## An Increasing Share Will Come from DG



Source: IHS

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# Top Global Solar Companies and Countries

## Polysilicon



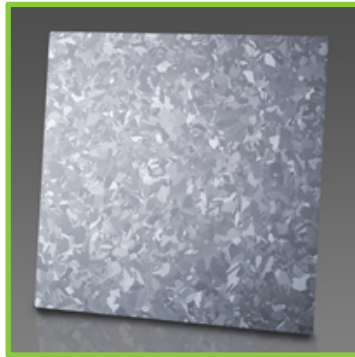
### 2015 Poly Production

1. GCL-Poly – 74 GT
2. Wacker – 56 GT
3. OCI – 48 GT
4. Hemlock – 25 GT
5. TBEA – 22 GT

### 2015 Country Share

1. China – 50%
2. South Korea – 17%
3. Germany – 16%
4. USA – 13%
5. Japan – 2%

## Wafer



### 2015 Wafer Production

1. GCL-Poly – 14.5 GW
2. Xi'An LONGi – 3 GW
3. LDK Solar – 2.7 GW
4. Jinko – 2.4 GW
5. Yingli – 2.3 GW

### 2015 Country Share

1. China – 80%
2. Not available

## Cell



### 2015 Cell Production

1. JA Solar – 3.9 GW
2. Trina – 3.3 GW
3. Hanwha – 3.2 GW
4. Motech – 2.4 GW
5. Jinko – 2.2 GW

### 2015 Country Share

1. China – 71%
2. Taiwan – 17%
3. Japan – 3%
4. South Korea – 3%
5. USA – 3%

## Module



### 2016 Annual Capacity

1. Jinko – 6.3 GW
2. GCL SI – 6 GW
3. Trina – 5.6 GW
4. Canadian – 5 GW
5. Hanwha – 4.8 GW

### 2015 Country Share

1. China – 73%
2. Japan – 8%
3. USA – 7%
4. South Korea – 4%
5. Taiwan – 3%

## Developer



### Operating Capacity (est.)

1. First Solar
2. China State Power Company
3. GCL NE – 2.7 GW
4. SunPower
5. Hareon

### 2015 Country Share

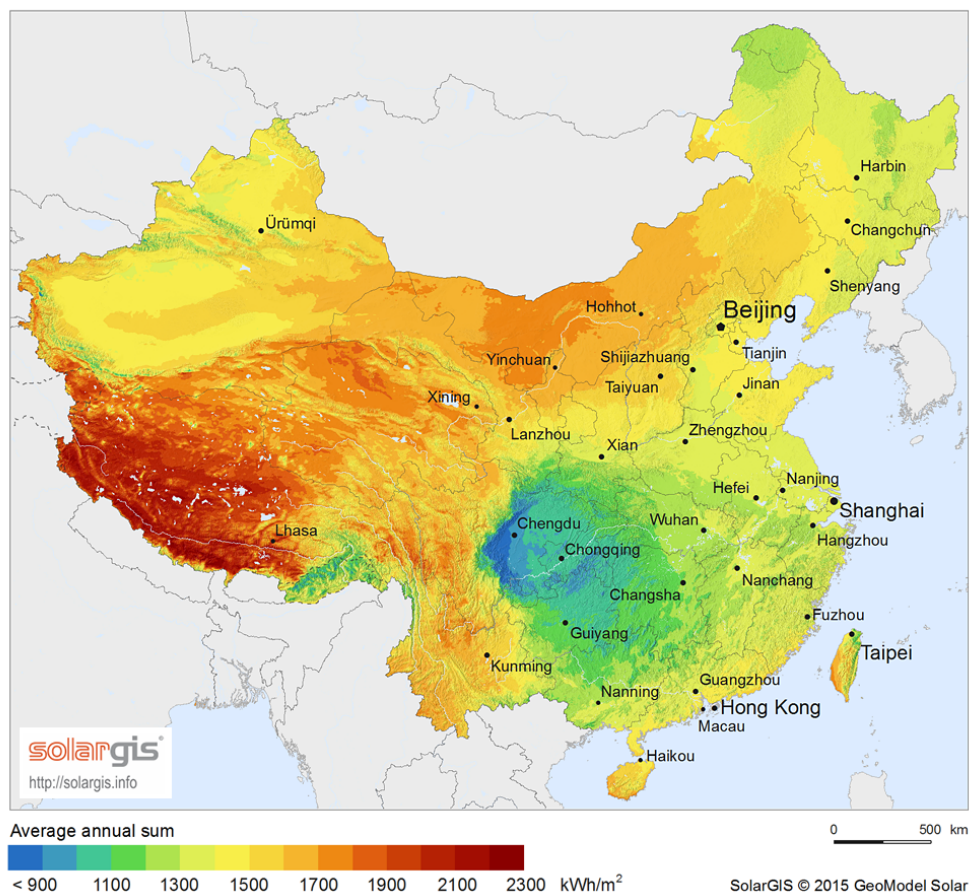
1. China – 34%
2. Japan – 21%
3. USA – 13%
4. UK – 7%
5. India – 4%

**China leads in every category of the solar supply chain**

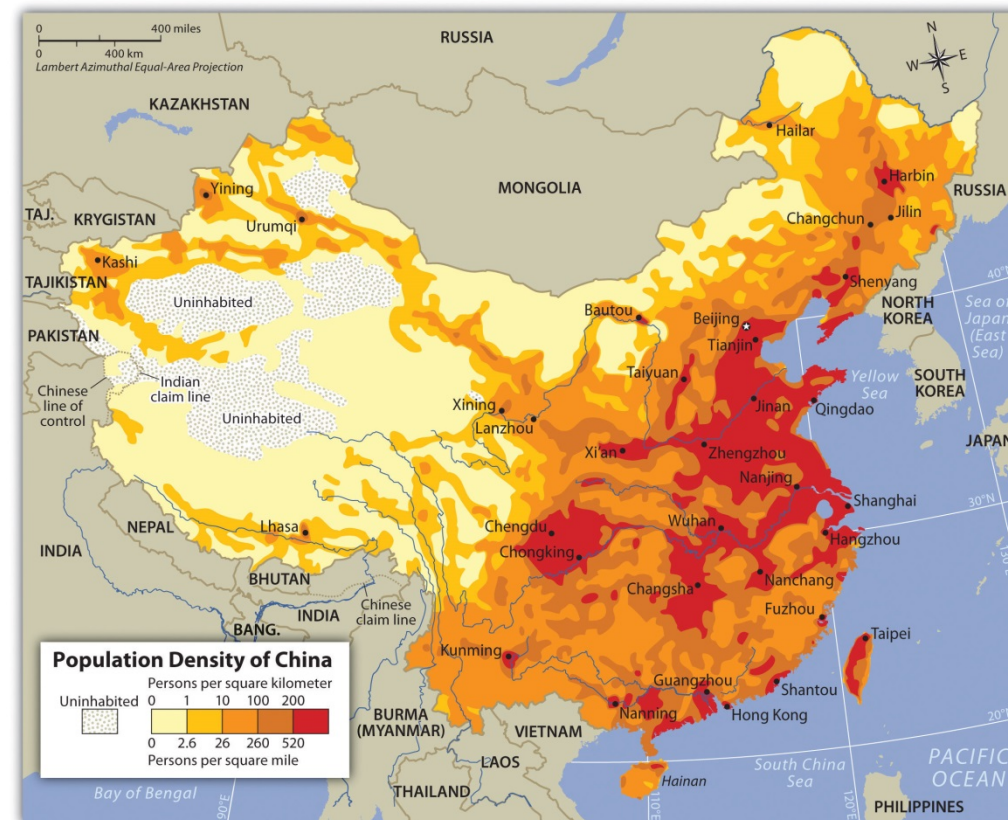


# China's Challenge: Solar in the West, Population in the East

## Solar Irradiation



## Population Density



- Government has imposed a moratorium on new projects in the sunny western region of the country where solar development has boomed.
- Curtailment of PV plant generation in Northwestern region due to insufficient transmission capacity has negatively impacted solar plant revenues
- Government plans a shift towards focus on distributed solar to bring generation closer to load

# China Solar Policy Overview



Feed In Tariff

Top Runner Program for Advanced Technologies

Poverty Alleviation Program

# Feed in Tariff

PV Power Generation Benchmark FiT price				
	Resource Area	By June 30, 2016 (USD/kWh)	After June 30, 2016 (USD/kWh)	Zones included in all resource areas
Utility Scale PV (Ground Mounted)	Type I	0.134	0.12	Western provinces and other areas with high solar resource or located farther from load centers
	Type II	0.14	0.13	Major cities and other electricity load centers
	Type III	0.15	0.146	Other zones not included in type I areas and type II areas
Distributed PV	0.06 USD/kWh subsidy on generating capacity. Remaining on-grid electricity generation after self-consumption is purchased by the Grid Corporation at the local coal benchmark price.			

- The Feed in Tariff (FiT) was established in 2011 to spur the solar market
- A cut in the FiT on June 30, 2016 led to a major boom in H1 2016 installations of at least 17 GW
- H2 will likely see installations of half that amount (~8 GW)

**Over 100 GW of solar has been installed since the implementation of the Feed in Tariff**



# Top Runner Program for Advanced Technologies

Approved pipeline of the Top Runner PV base in 2016

Province	Base Name	System Size (MW)
Hebei	Winter Olympics PV Corridor Base	500
Shanxi	Yangquan Coal Mining Area	1000
	Ruicheng County	500
Inner Mongolia	Baotou Coal Mining Area	1000
	Wuhai Coal Mining Area	500
Anhui	Huainan and Huaibei Coal Mining Area	1000
Shandong	Jining Coal Mining Area	500
	Xintai Coal Mining Area	500
Subtotal		5500

Source: National Energy Administration

Top Runner projects to account for roughly 30% of China's 2016 annual installations

GCL System Integration received Top Runner Level 1 Certification in April 2016

## ➤ Program Overview

- The Top Runner Program was established in 2015 by China's National Energy Administration (NEA) to spur demand for advanced solar technologies through demonstration projects

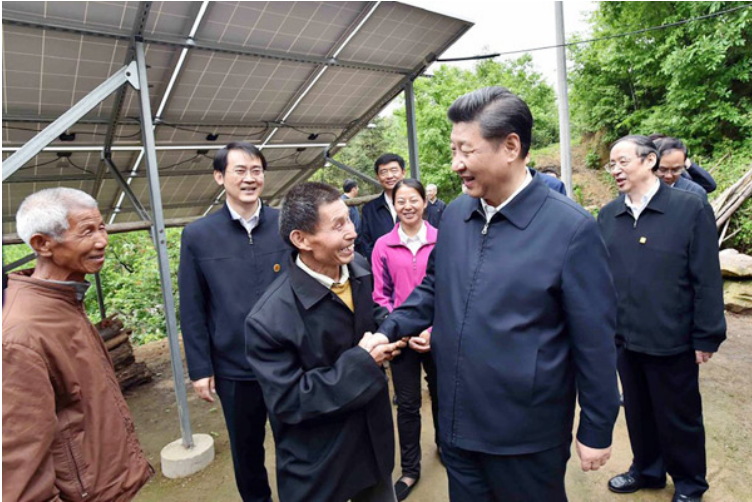
## ➤ Top Runner Program Requirements in 2015

- Polycrystalline PV module conversion efficiency must exceed 16.5% and monocrystalline PV module must exceed 17%
- HCPV module conversion efficiency must exceed 30%
- Conversion efficiency of 3-silyl, CIGS, CdTe and other kinds of thin film must exceed 12%, 13%, 13% and 12% respectively

## ➤ Top Runner Program Advantages

- Some national power programs give precedence to advanced technologies included in the Top Runner Program
- Chinese government gives marketing support to key facilities and technologies included in the Top Runner Plan
- Companies can boost their brand and encourage other companies in the PV industry to raise product quality and conversion efficiencies

# Solar Poverty Alleviation Program



After the Chinese national government released the poverty alleviation policy, provincial and municipal governments successively released regional poverty alleviation policies. Soon, PV power plants for poverty alleviation appeared in many provinces and cities in China.

Recently, provinces like Gansu and Shanxi released policies to push the deployment of rural PV power plants. Cities like Fuyang and Jinan have stated that they will continue to increase deployment of village-level PV power plants.



- **Gansu province** will keep carrying out the PV poverty alleviation projects in 48 districts and 11 villages.
- **Shanxi province** will build 300 village-level PV power plants for poverty alleviation.
- **Fuyang city** plans to build 211 village-level PV power plants.
- **Jinan city** will build PV power plants of which the generated power can be fully purchased by the grid corporation for poverty alleviation in 549 villages.