



**水电水利规划设计总院**  
China Renewable Energy Engineering Institute

# **Renewable Energy in China: Status and Prospects**

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The background of the slide is a photograph of a large dam with water cascading over its spillways, creating a misty spray at the base. The image is overlaid with a blue gradient and abstract wavy shapes at the bottom.

1

**Status of Renewable Energy in China**

2

**Visions and Targets for RE development**

3

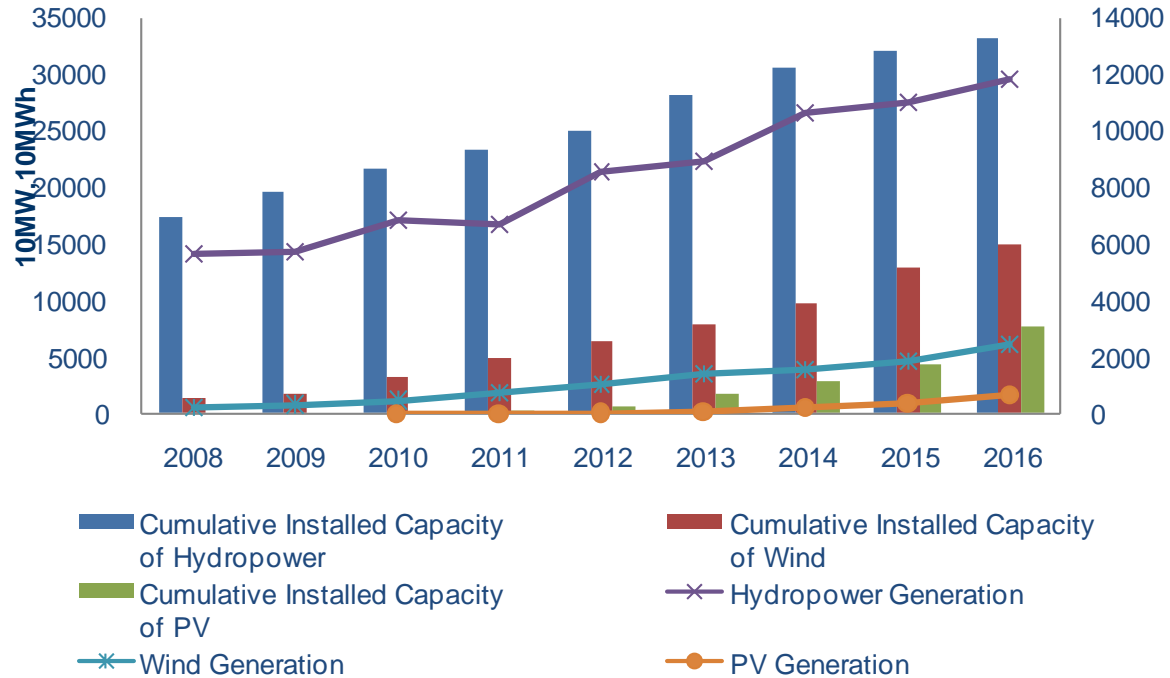
**RE Policies in China**

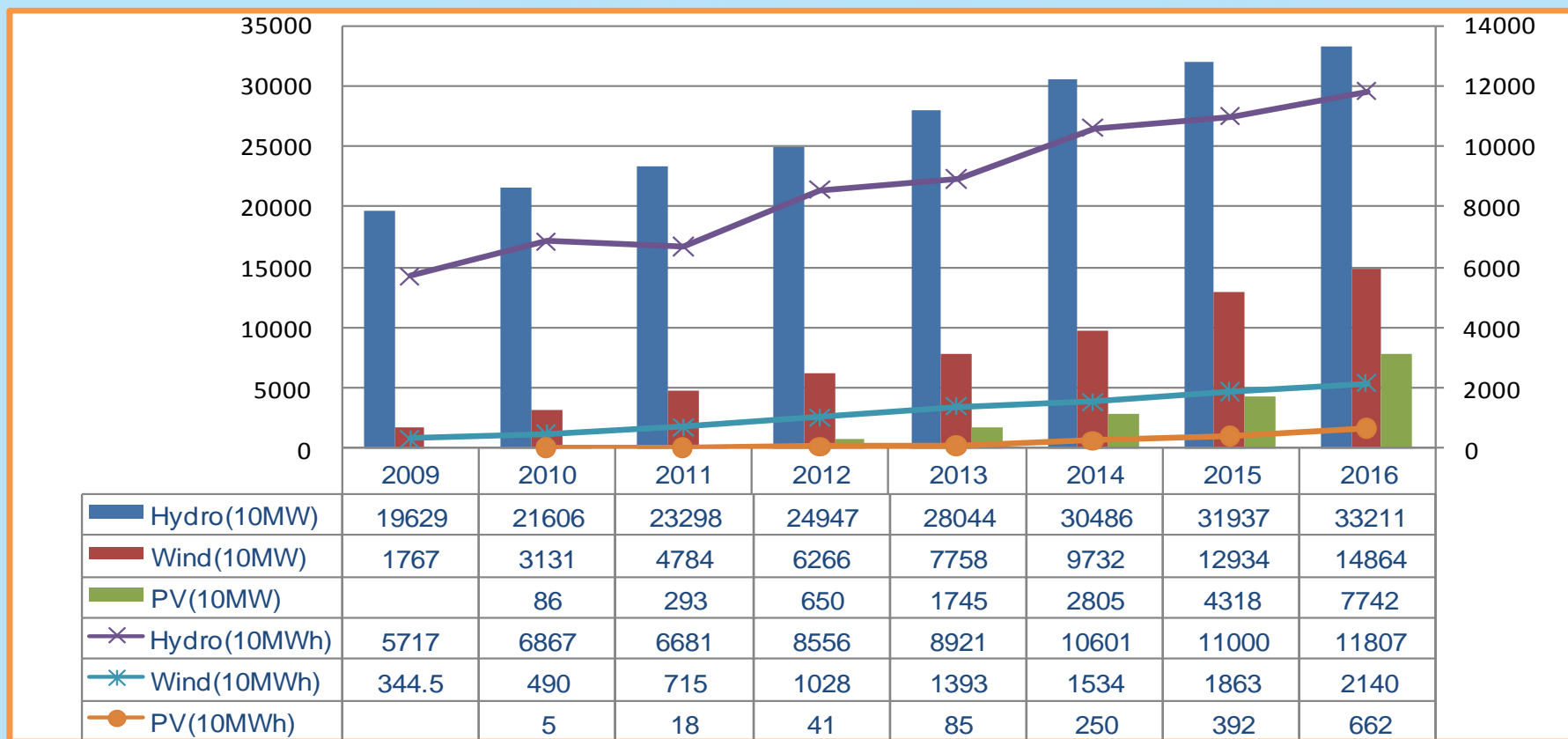
# 1

## **Status of Renewable Energy in China**

**RE takes an important role in energy restructuring.**

As of 2016, the proportion of non-fossil energy in total energy consumption in China was **13.3%**.  
The total renewable energy consumption was **0.55 billion tons of coal equivalent** in 2016.



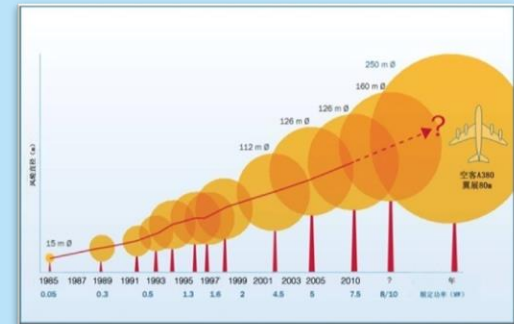


By the year end of 2016, China has 332.11GW, 148.64GW, and 77.42GW of hydropower (incl. 26.69 GW of pumped hydro), wind and solar PV installed. Their 2016 annual power productions reached 1,181TWh, 241TWh, and 66TWh respectively.

**The generation technology R&D and production capacities have improved significantly.**

## Wind

- Established local manufacturing capacities of major wind turbine components
- Produced 5-6MW prototypes and installed for testing
- Increased deployments of longer-blade turbines in central and southeast areas



Upgrading Large Capacity Wind Turbine

## PV

- Promote advance PV technologies by granting concessions for demo sites in “Frontrunner Base”
- The Base only allows multi-Si module is  $\geq 16.5\%$ , mono-Si module is  $\geq 17\%$ , the system PR is  $\geq 81\%$
- Six out of the top 10 module manufacturers globally are Chinese. While Trinasolar has the largest manufacturing capacity over the world.



“Frontrunner”PV Demo Base in the Subsidence Area in Datong, China

Solar-hydro hybrid power station



Poverty alleviation scheme by rolling out PV projects in rural areas



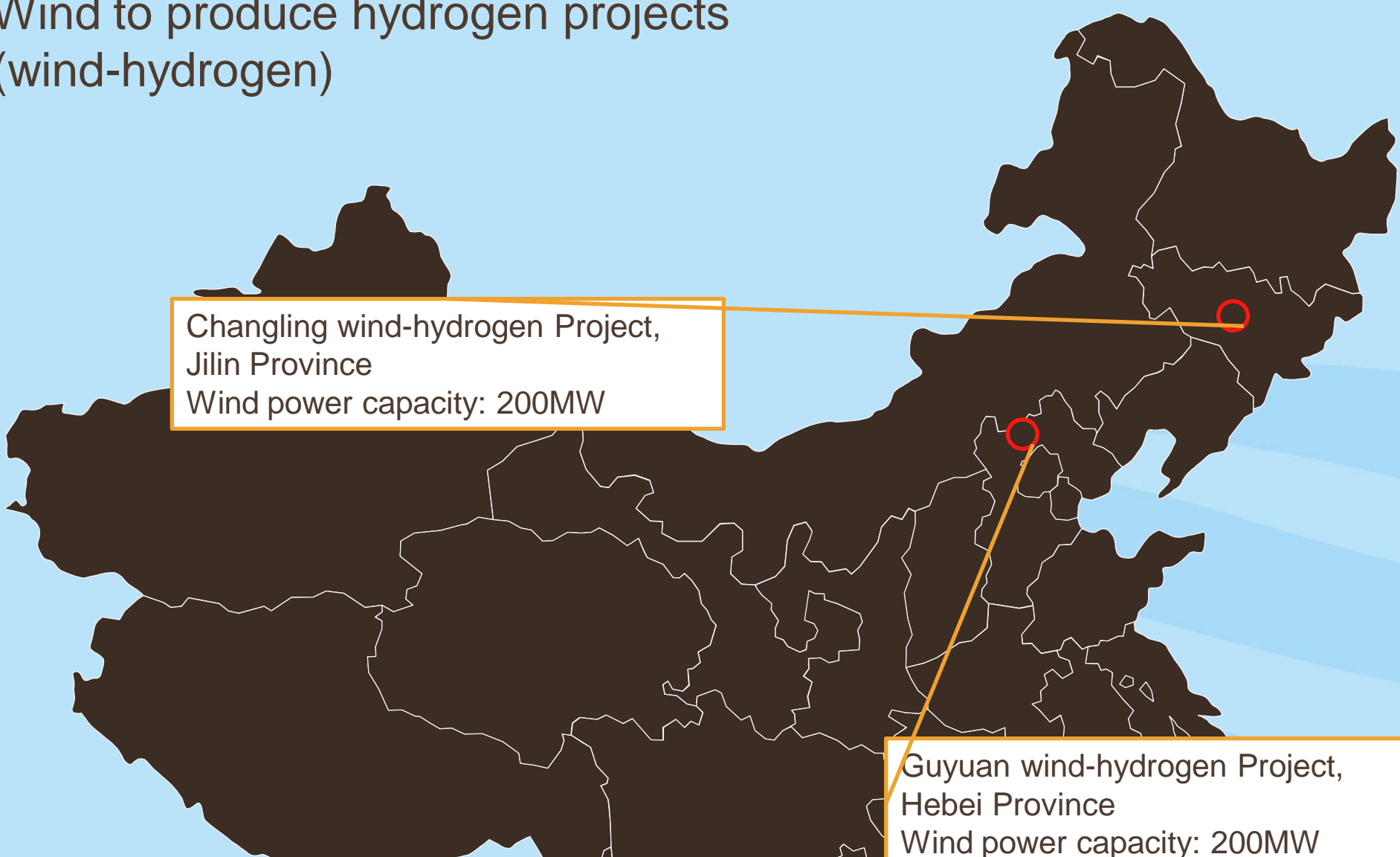
PV and fisheries integrated design



PV and agriculture integrated design



## Wind to produce hydrogen projects (wind-hydrogen)

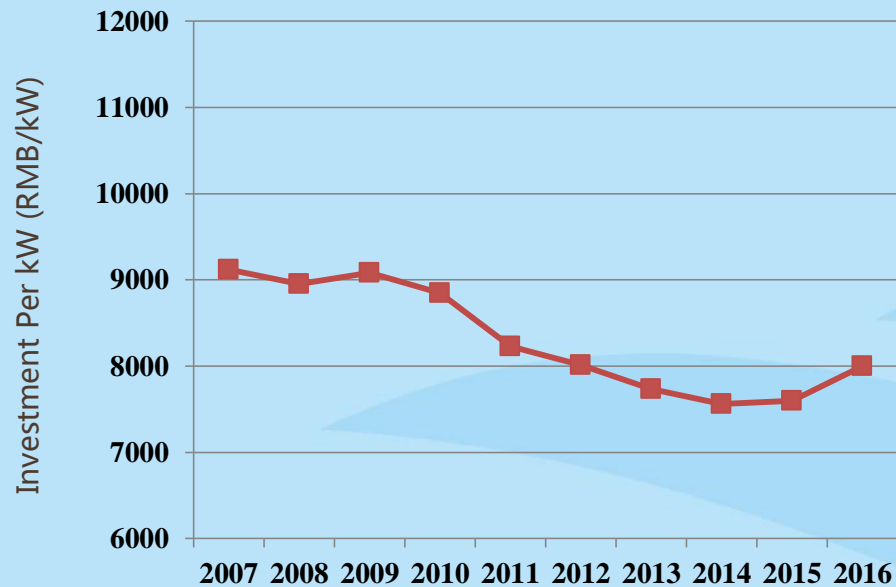


Changling wind-hydrogen Project,  
Jilin Province  
Wind power capacity: 200MW

Guyuan wind-hydrogen Project,  
Hebei Province  
Wind power capacity: 200MW

**CAPEX has declined.**

Wind Capex, 2007-2016



Large scale solar PV Capex, 2012-2016

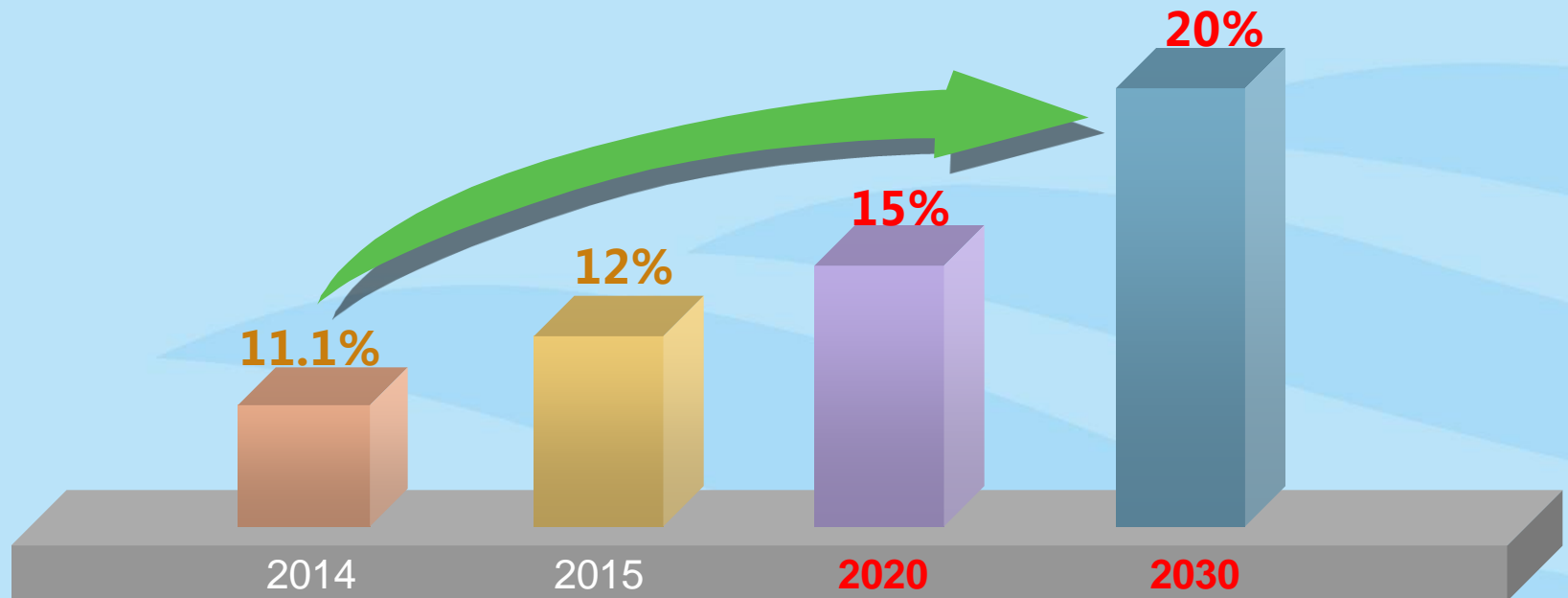




# **Visions and Targets for RE development**

## LONG-TERM TARGETS

Proportion of non-fossil energy consumption to primary energy consumption in China



## 2020 Targets

1

### Total

- ◆ Total RE usage reaches 730mtce
- ◆ Wholesale RE usage reaches 580mtce

2

### Power Generation

- ◆ Aggregated installed power generation capacity reaches 680GW
- ◆ Annual RE generation reaches 1900TWh equals to 27% of the total generation

3

### Heating and Fuel Replacement

- ◆ RE based heating and residential fuel supplies reaches 150mtce

4

### Economic Efficiency

- ◆ Onshore large scale wind power reaches grid parity
- ◆ Large scale PV reaches retail price parity

5

### Penetration and Consumption

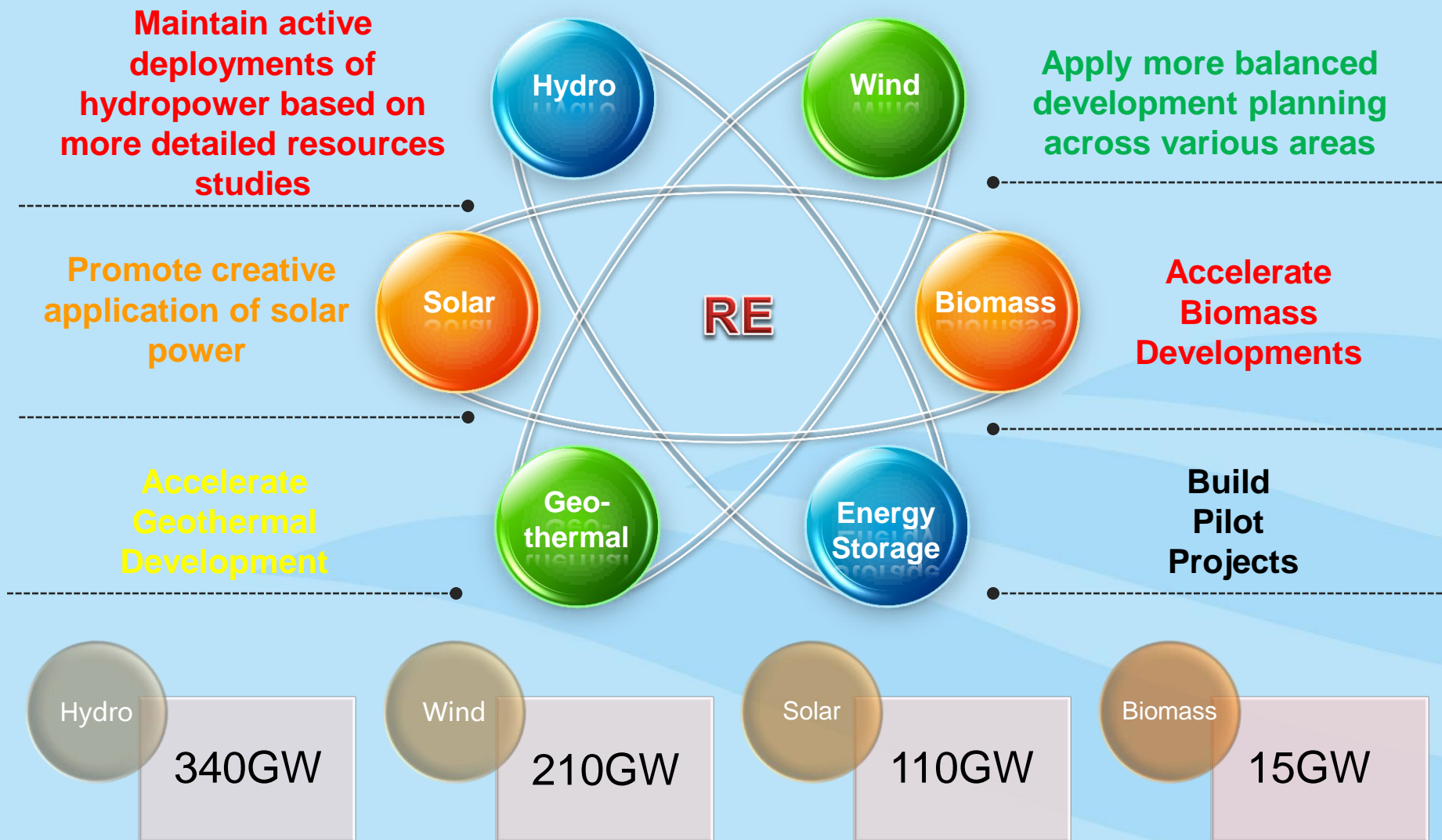
- ◆ Zero hydropower curtailment
- ◆ Guaranteed onshore wind and solar PV utilization hours

6

### Mandatory Constraint Mechanism

- ◆ Enforce the mandates of the RE to primary energy consumption percentage
- ◆ Compulsory quota system will take effects for power producers

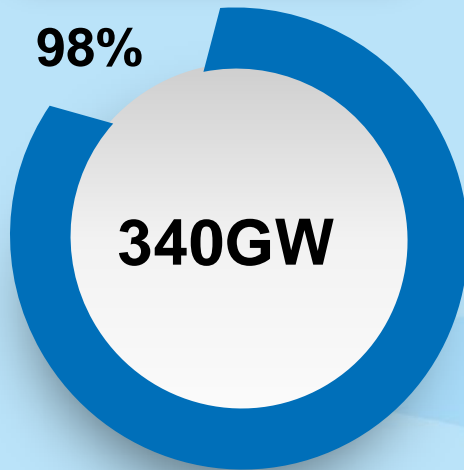
## 13<sup>th</sup> Five Year Plan for RE



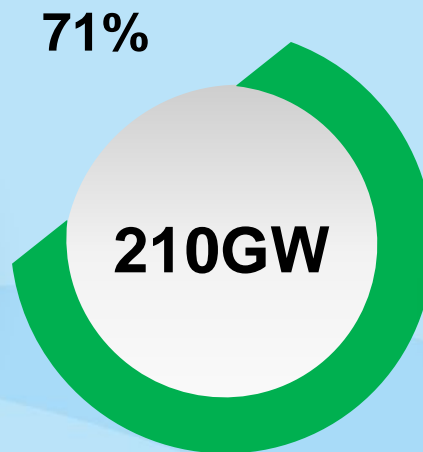


## 2016 Installed (%) vs. 2020 Targets (GW)

Hydro



Wind



PV



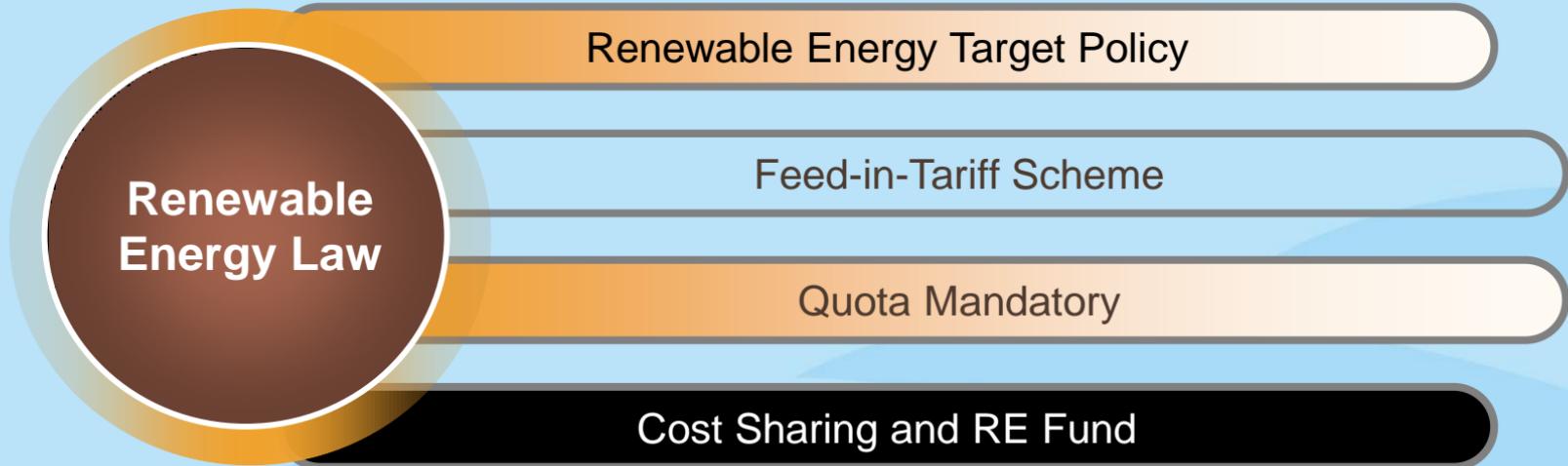
Biomass





# **RE Policies in China**

## Renewable Energy Law (2006)



**Renewable  
Energy Law**

Renewable Energy Target Policy

Feed-in-Tariff Scheme

Quota Mandatory

Cost Sharing and RE Fund



RE Law  
Enactment  
Feb 2005

RE Law  
Enforcement  
Jan 2006

Mid-Long Term  
RE Development Plan  
2007

RE Law  
Amendment  
Dec 2009

RE Target Guiding Scheme  
Mar 2016

Guaranteed RE Power Purchase Regulation &  
RE Target Guiding Scheme

Based on the Target Guiding Scheme, RE (excluding hydropower) should take up 5%~13% of the power consumption for each province by 2020.

## Feed-in-Tariff (2016)

Technology	Tariff
<b>Onshore Wind</b>	CNY0.47-0.60/kWh
<b>Offshore Wind</b>	CNY0.80-0.98/kWh
<b>Solar PV</b>	Intertidal: CNY0.75/kWh Offshore: CNY 0.85/kWh
<b>Solar Thermal</b>	Pilot Project Only: CNY1.15/kWh

## Dispatch & Quota Mandatory

### Primary Dispatch

- Prioritizing non-dispatchable RE and balancing thermal power plants

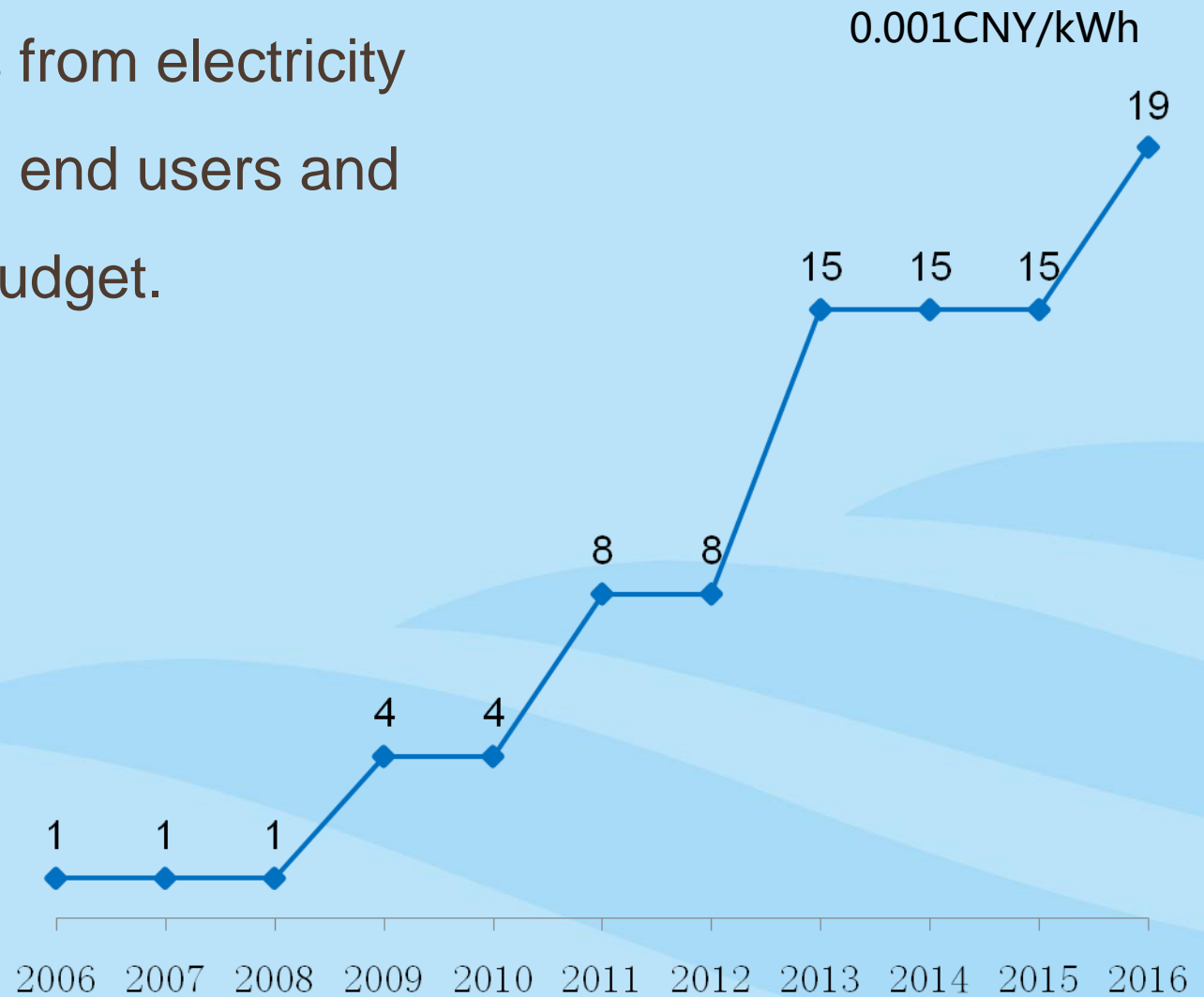
### Guaranteed Dispatch

- Guaranteed annual utilization hours for onshore wind and solar PV on provincial level

### Consumption Promotion

- National Renewable Energy Certificate Scheme

RE fund comes from electricity surcharge to all end users and annual public budget.



## **RE Incentive Policies for the 13<sup>th</sup> Five Years.**

Encouraging competitive bidding mechanism for new projects

Adopting carbon emission reduction policy & REC scheme

Renewable Portfolio Standard

Promoting micro-grid and distributed PV deployments on consumption side



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# Thanks!