

# REVIEW AND OUTLOOK ON CHINA RENEWABLE ENERGY

LI JUNFENG

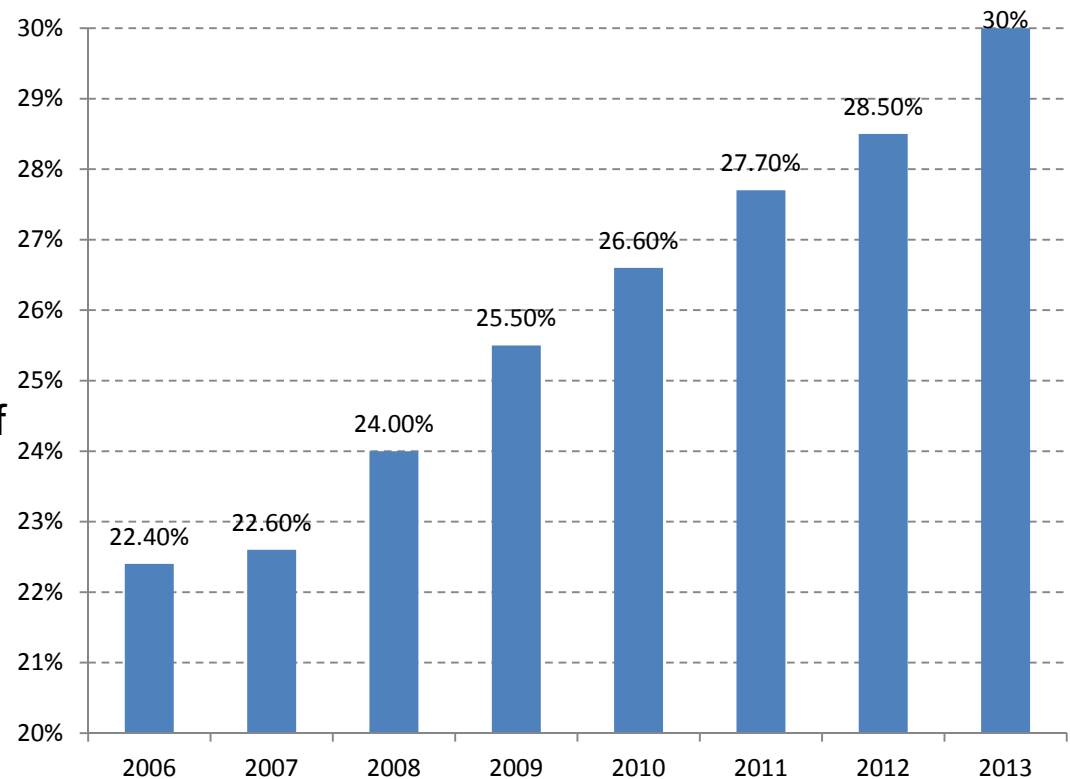
JUNE 27, 2014

Chinese Renewable Energy Industries Association

## Renewable Energy Market in China

- China's renewable energy market has experienced rapid growth due to continuously growing demand and effective policy support.
- In 2013, China's renewable power accumulated installed capacity reached **378GW**, accounted for **30%** of total power capacity.
- In 2013, electricity generated by renewables exceeded **1 trillion kwh**, made up over **20%** of total electric power generated from all sources.

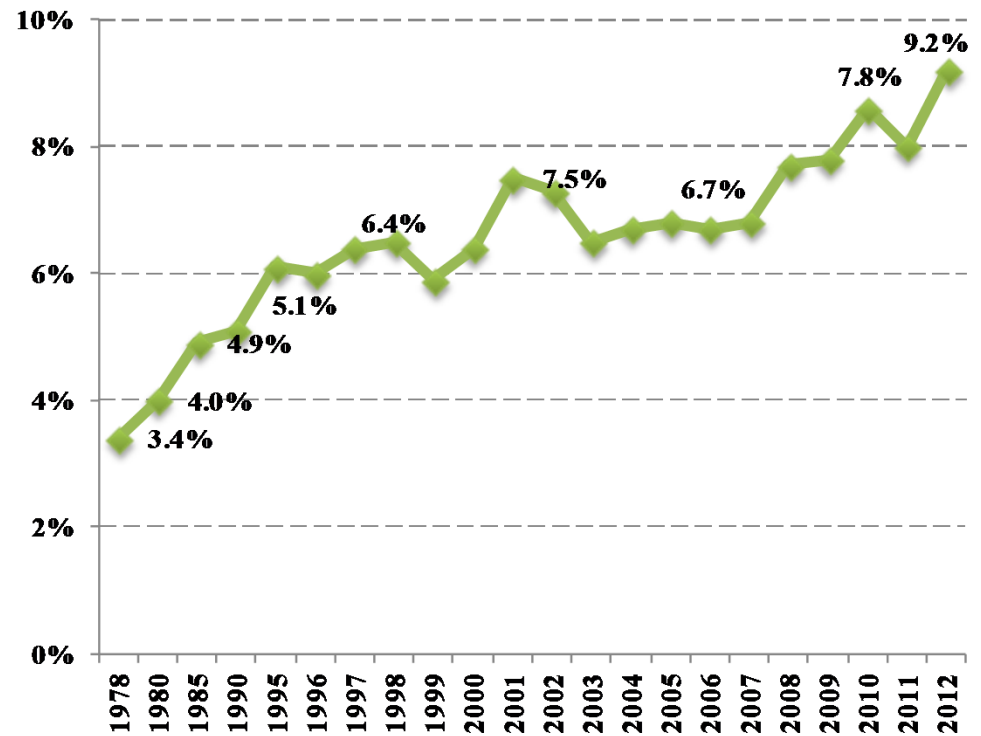
## 2006-2013 China's renewable energy share of total power installed capacity



## Renewable Energy Market in China

- In 2013, renewables made an estimated 9.3% of total primary energy consumption in China.
- In 2013, electric power generated from wind reached 140 billion kwh. From 2012 on, wind overtook nuclear and became China's 3rd largest energy source.

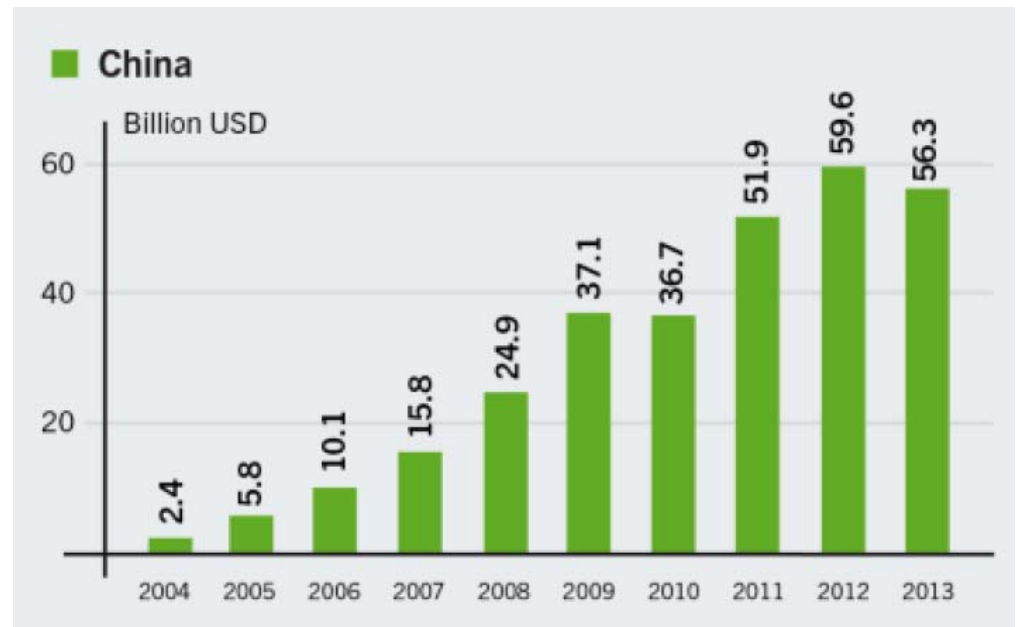
1978-2012 China's non-fossil energy share of total final energy use



## Renewable Energy Investment in China

- China's total investment in renewables was **USD 56.3 billion** incl. R&D in 2013.
- Investment in renewables **surpassed fossil fuel** capacity additions for the first time.
- The decline in investment mainly comes from **significant cost reductions** of technologies.

## 2004-2013 China's New Investment in Renewable Energy

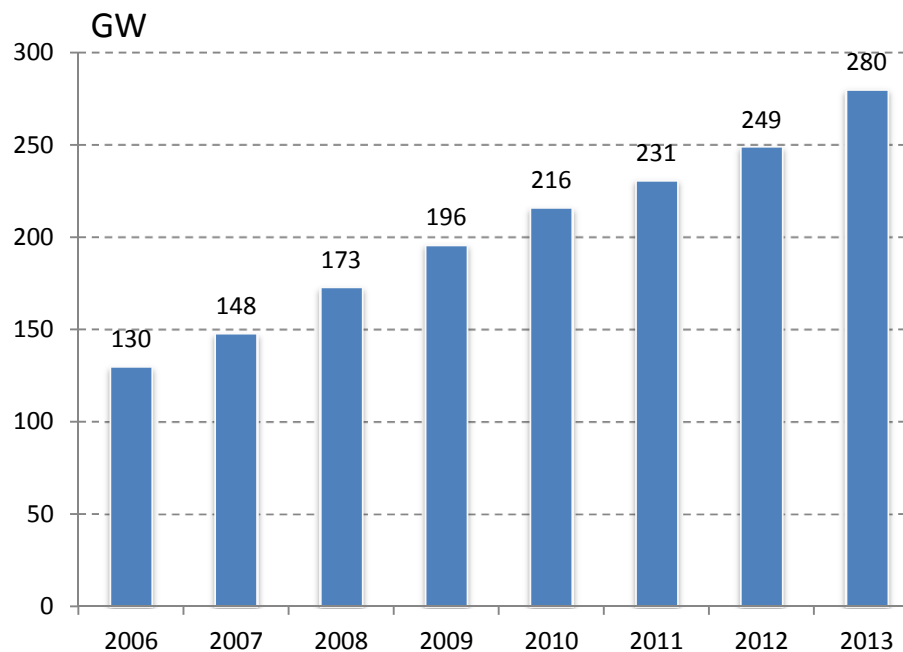


Source: REN21 GSR 2014

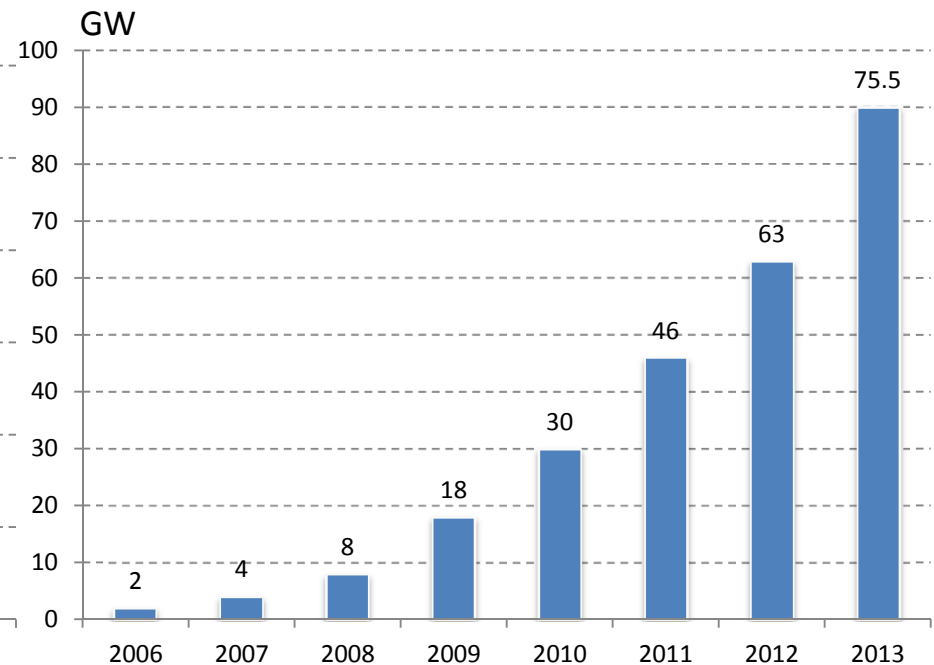
## Renewable Energy Market in China

- The accumulated capacity of hydro, wind and solar pv as major renewable power sources are shown in the following charts.

2006-2013 Hydro power accumulated capacity



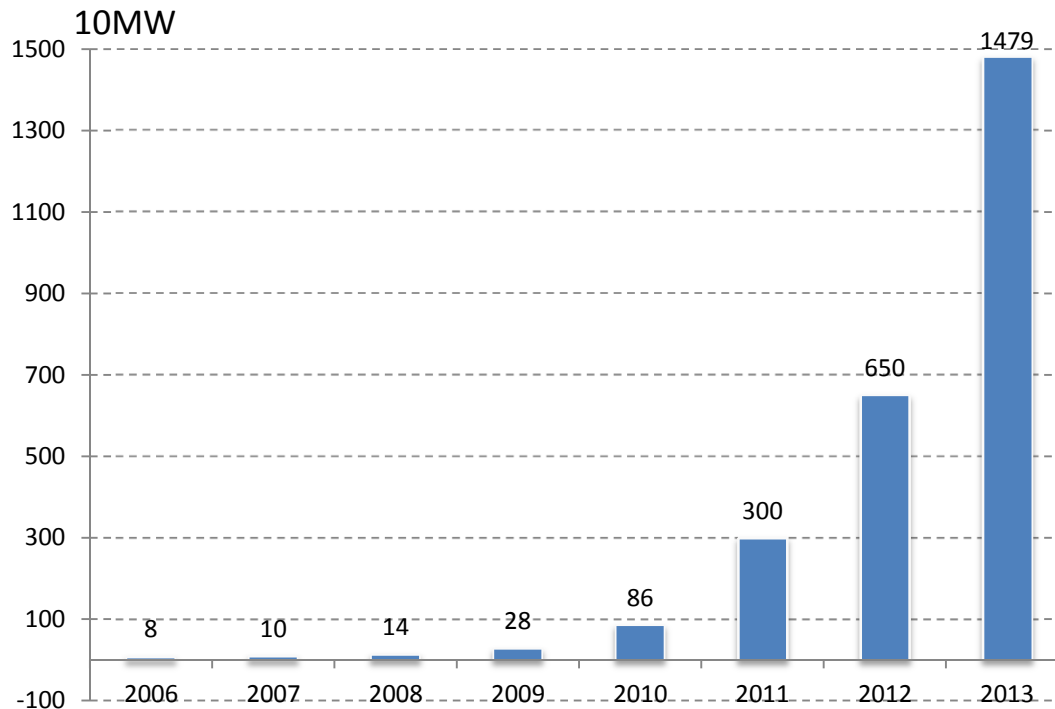
2006-2013 Wind power accumulated capacity



## Renewable Energy Market in China

- The accumulated capacity of hydro, wind and solar pv as major renewable power sources are shown in the following charts.

2006-2013 PV power accumulated capacity



## Renewable Energy Growth in China

### Hydro

- New installed capacity reached **30GW** in 2013.

### Wind

- New installed capacity reached **14GW** in 2013.
- The average turbine's operational period increased 151 hours on 2012 to **2,080 hours**, which is a new high since 2005.

### Solar PV

- New installed capacity reached **11.3GW** in 2013, including both large-scale and distributed power plants.

### CSP

- China's first **10MW** solar thermal power Plant was connected to the grid in Qinghai province.

## Renewable Energy Growth in China

### Bio Energy

- Bio-power capacity reached **6.2 GW** (excluding 2.3 GW waste-to-energy combustion) by 2013.
- The expansion of bio-power capacity in China is slowing due to limited availability of suitable biomass.

### Solar Thermal

- **46.2 GW** (up 3.3%) were added in 2013 for a total of **217 GW**.
- Solar water heaters cost far less over their lifetimes than do electric or gas water heaters in China, which makes it economically viable.



Policy Instruments: Chinese government has determined to optimize its energy mix with high share of renewables. A series of policy instruments have been taken into place to support such transition.

## Renewable Energy Surcharge

- 0.015 Yuan (0.25 U.S. cent) per kwh.
- The surcharge pays for the China Renewable Energy Development Fund, which goes to subsidies to developers of renewable-energy projects.

## Wind

- Classified FiT rates in the range of CNY 0.51-0.61(\$0.08-0.10)/kWh for 4 areas.

## Solar PV

- Large, transmission grid connected PV projects :Classified rates CNY0.90, 0.95, 1.00 (\$0.15-0.16)/kWh for 3 areas.
- Distributed PV projects: CNY0.42(\$0.07)/kWh generated, plus coal-fire power price which is around CNY0.20 - 0.36(\$0.03 – 0.06)/kWh if surplus electricity feeds back to the grid. (Further amendment for better incentive is under discussion)

## Distribution grid connected PV project

**Self-consumption**  
(savings on electricity bill)

Premium FiT of CNY0.42(\$0.07) /kWh  
plus local electricity price

**Sent to the grid**  
(purchased by the grid company)

Premium FiT of CNY0.42(\$0.07) /kWh  
plus the local coal-fired power tariff

**Self-consumption is  
encouraged**

China's 12th Five-Year Plan (2011-2015): Non-fossil fuel is targeted to reach 11.4% of total primary energy consumption by 2015.

## Energy consumption

- 4 billion tce of national energy consumption
- 6.15 trillion kwhs electricity consumption
- 17% carbon intensity reduction
- 16% cut in energy intensity ( energy consumption per capita)

## Energy Transition

- 8% of electricity consumption annual growth
- Cap coal share under 65%, with no more than 3.9 billion tons of production
- Non-fossil fuel share reaches 11.4%

China's 12th Five-Year Plan (2011-2015): Renewable Energy is targeted to reach 33% of total electric power capacity by 2015, hydro and wind still dominating

## Hydro

- Installed capacity of 420GW, up from 211GW in 2010.

## Wind

- Installed capacity of 100GW, with annual electricity generation over 190 billion kwh.
- 5GW off-shore

## Solar

- PV Power: Installed capacity of 35GW, including both large-scale and distributed power plants.
- CSP: Installed capacity of 1GW by 2015, 3 GW by 2020

## Biomass

- 13GW installed capacity by 2015, with annual electricity generation over 7.8 billion kwh.

## Integrated Demonstration Project

### New energy cities (100)

- New energy makes over 3% of primary energy consumption, no less than 6% by 2015.
- At least 2 kinds of new energy have to be deployed

### Green energy counties (200)

- Over 100 green counties have been granted
- A subsidy of CNY 25 million per county

### New energy micro-grid projects (30)

- An integration of rooftop PV power station, energy storage system, electric car charging station and distribution network

### Distributed PV power generation demonstration area (18)

- 18 projects with the total capacity of 1.8GW
- Scheduled to complete in 2015



## Integrated Demonstration Project

- According to the demonstration project plans, **full use of local renewable energy sources** like solar, wind, geothermal and biomass, is of great importance and defined as key performance indicator.
- With a series of renewable energy integrated demonstration projects, China shows strong will to kick out domestic market by **encouraging local usage of renewables**.
- A focus transition from manufacturing to end use is taking place, according to which energy consumption structure would be dramatically changed.

**THANK YOU**

**LI JUNFENG**

**EMAIL: [li-junfeng@163.com](mailto:li-junfeng@163.com)**

**TEL: +86 10 68781581**

**Chinese Renewable Energy Industries Association**