中国可再生能源发展
-产业、目标与政策

Development Status of Renewable Energy in China
-Industries、Goals and Policies

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2017年9月11日
Sep.11th 2016

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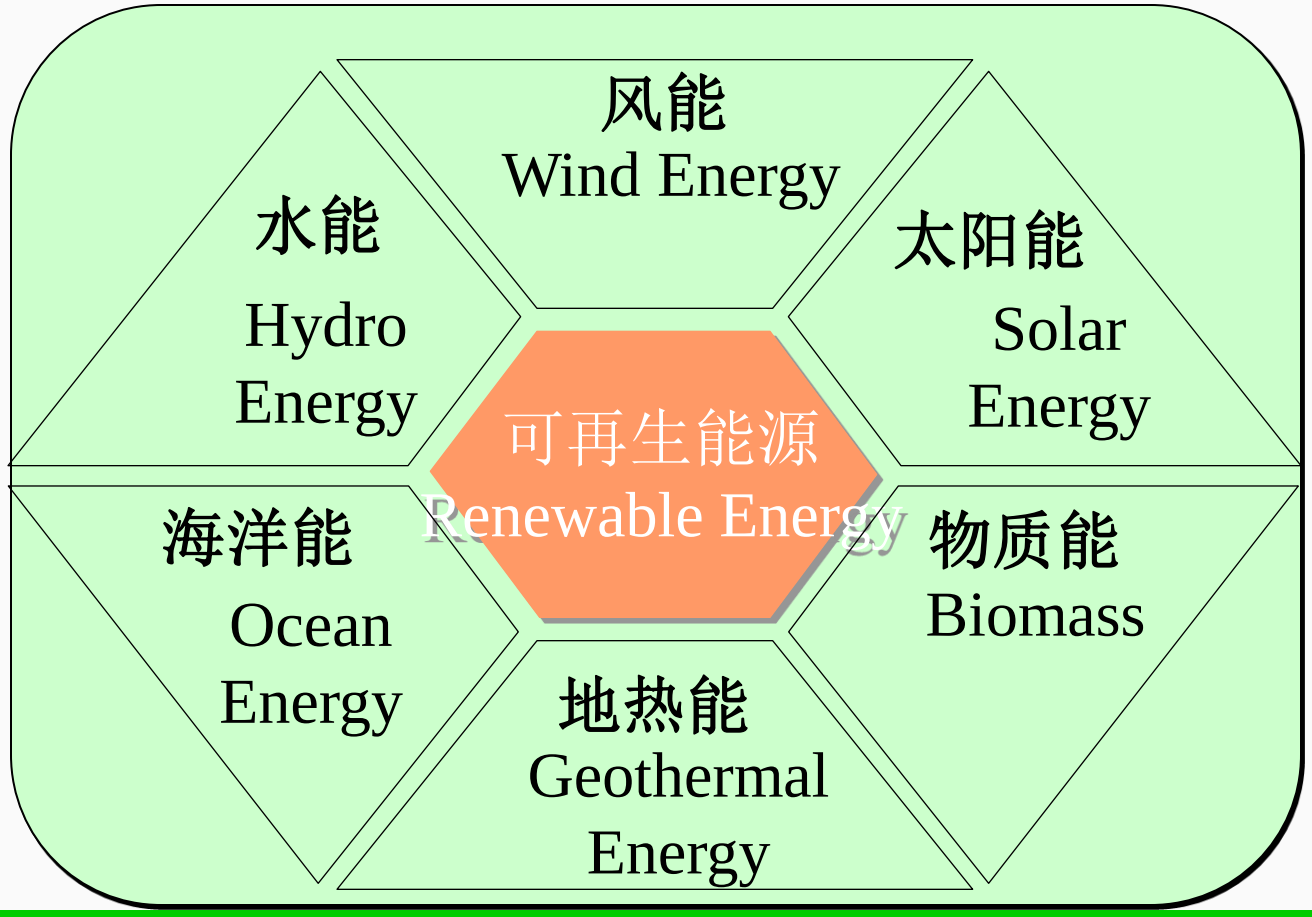
- **Goals of China's RE Development During the 13th Five Year Plan (2016-2020)**
- **China's Renewable Energy Policies.**

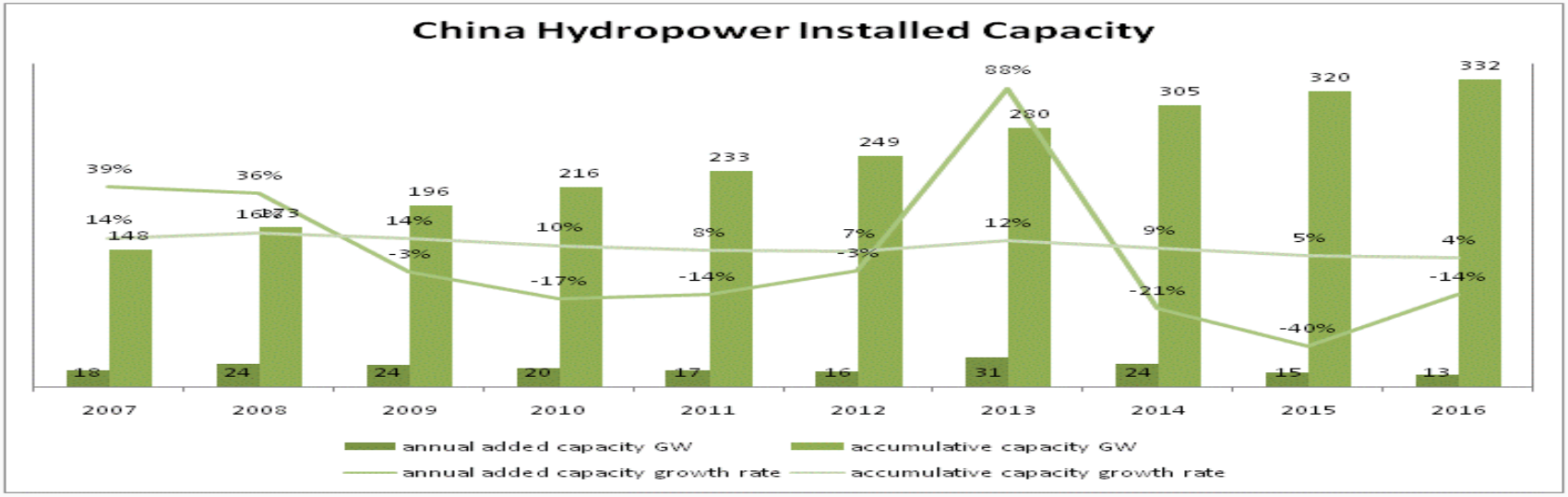
中国可再生能源产业发展现状
Current Status of China's RE Development

Concept of Renewable Energy in China

Including all kinds of useful energy and resources through processing and transformation

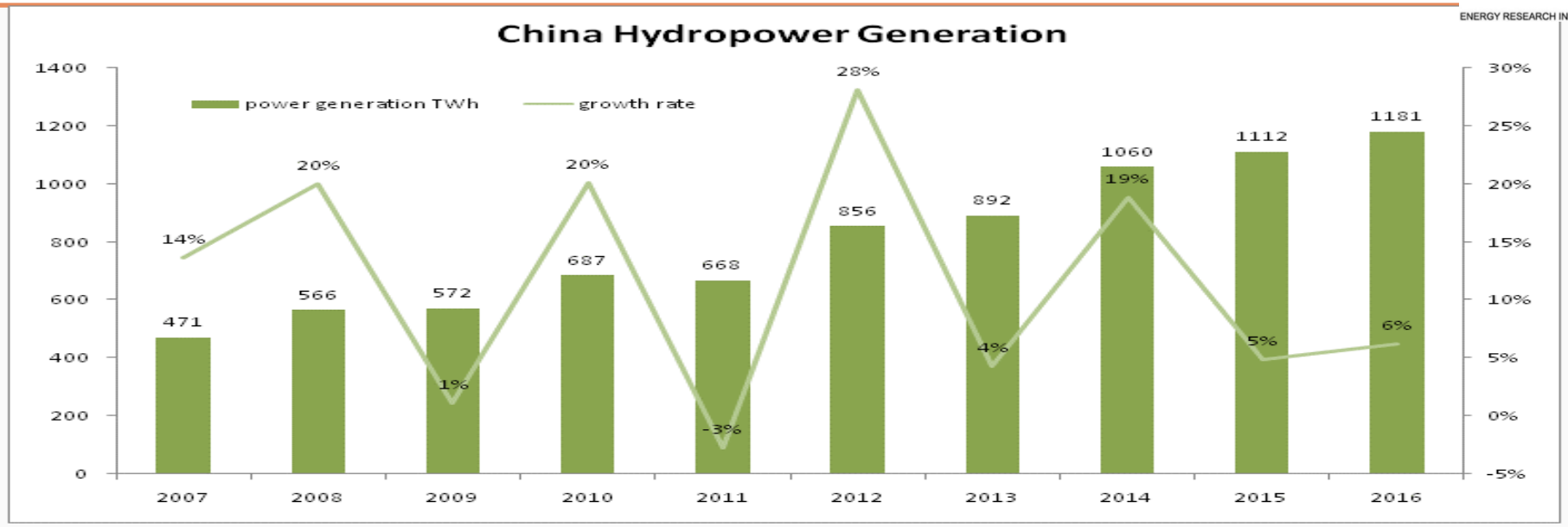


China's Hydropower Development- Installed Capacity



By the end of 2016, the total installed capacity of hydropower was 332 GW, accounting for about 20.9% of the total installed capacity in China.

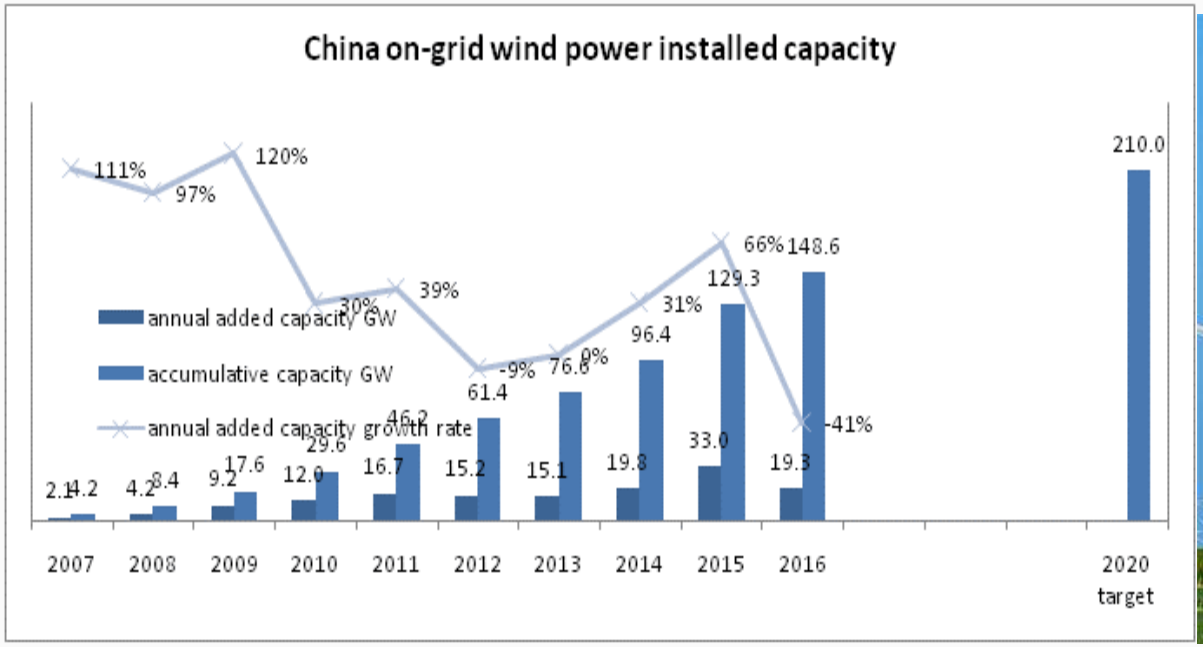
China's Hydropower Development-Generation



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
power generation TWh	396	415	471	566	572	687	668	856	892	1060	1112	1181
growth rate		5%	14%	20%	1%	20%	-3%	28%	4%	19%	5%	6%

By the end of 2016, its cumulative power generation was 1181 TWh, accounting for 19.2% of the total power generation, with year-on-year growth of 6%.

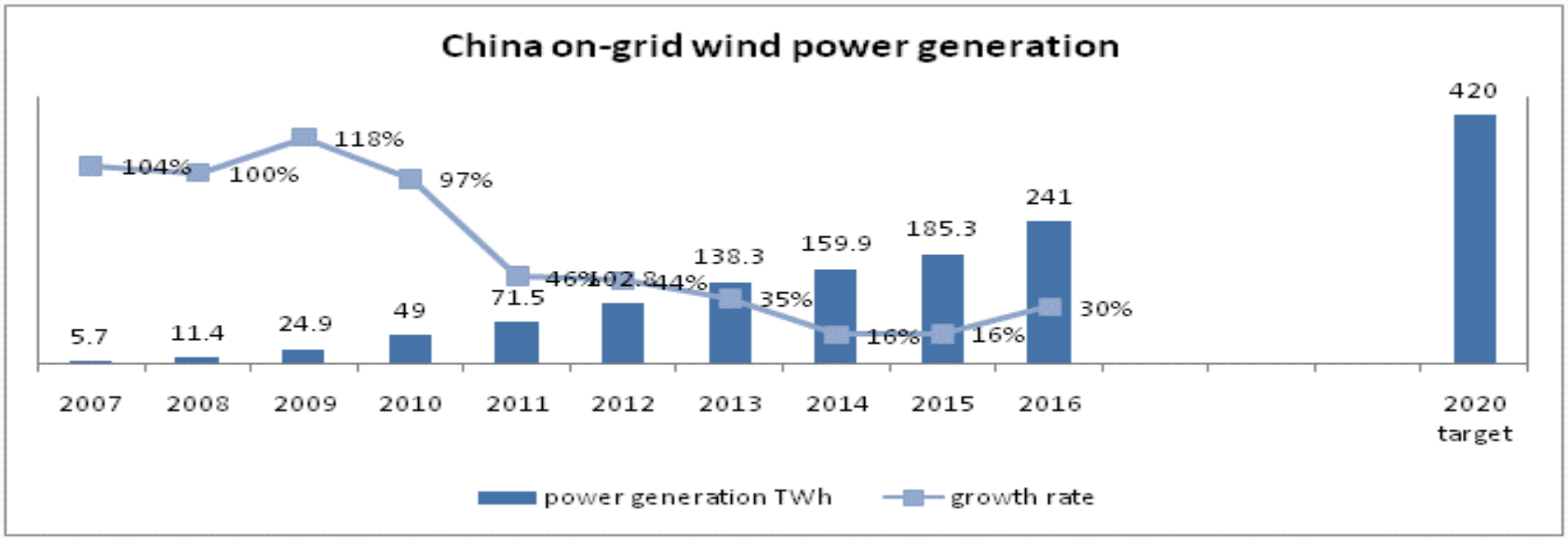
China's Wind Power Development- Installed Capacity



By the end of 2016, cumulative installed capacity reached 148.64 GW. With the influence of the adjustment of price policy , newly installed capacity was 19.3GW in 2016.By July this year, cumulative installed capacity reached 156 GW。

Among the added wind turbines, the installed capacity of 2 MW wind turbine accounted for more than 50% of the total added installed capacity, and the research of offshore wind turbine over 5 MW also developed quickly.

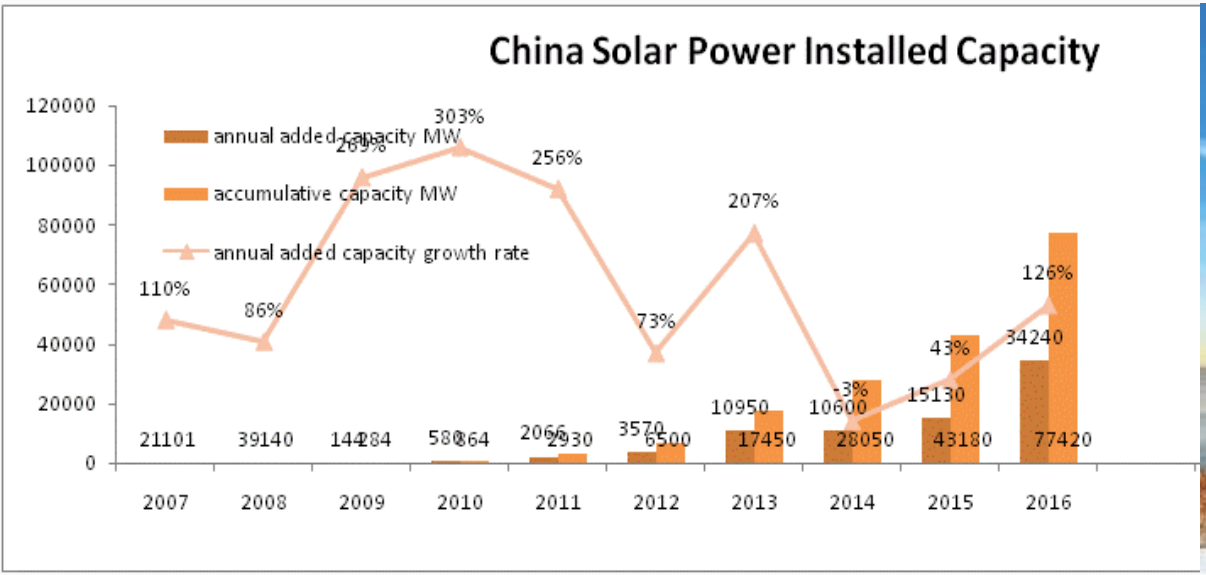
China's Wind Power Development- Generation



By the end of 2016, its cumulative power generation was 241 TWh, accounting for 4.02% of the total power generation, with year-on-year growth of 30%. Being One of the three big power resources.

In July of 2017, its cumulative power generation was 20.1 TWh, accounting for 3.3% of the total power generation. In which, 74% of the grid connected wind power (14.87TWh) from the "Three North" areas.

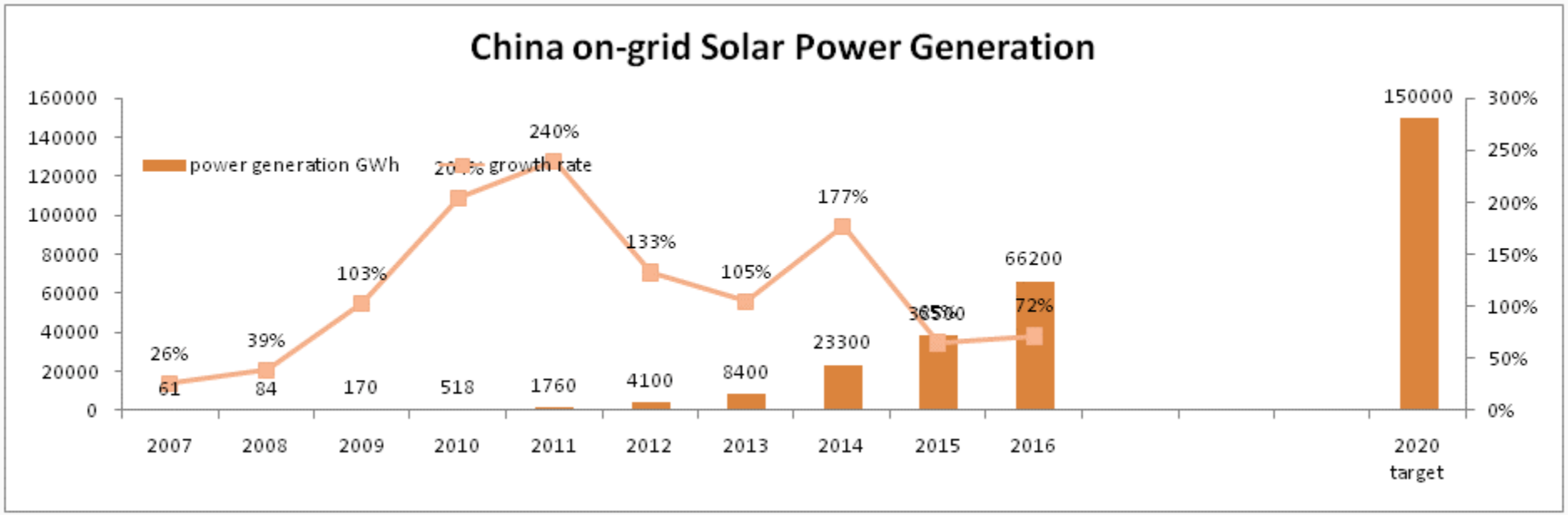
China's Solar Power Development- Installed Capacity



The industry of PV power generation has developed rapidly in China. By the end of 2016, the total installed capacity of PV power reached 77.42 GW, accounting for 4.7% of the total power installed capacity. Among them, the centralized grid-connected PV power stations still occupied dominant position, and their cumulative installed capacity was 67.10 GW; the distributed PV power stations was relatively slow, and their cumulative installed capacity was 10.32GW.

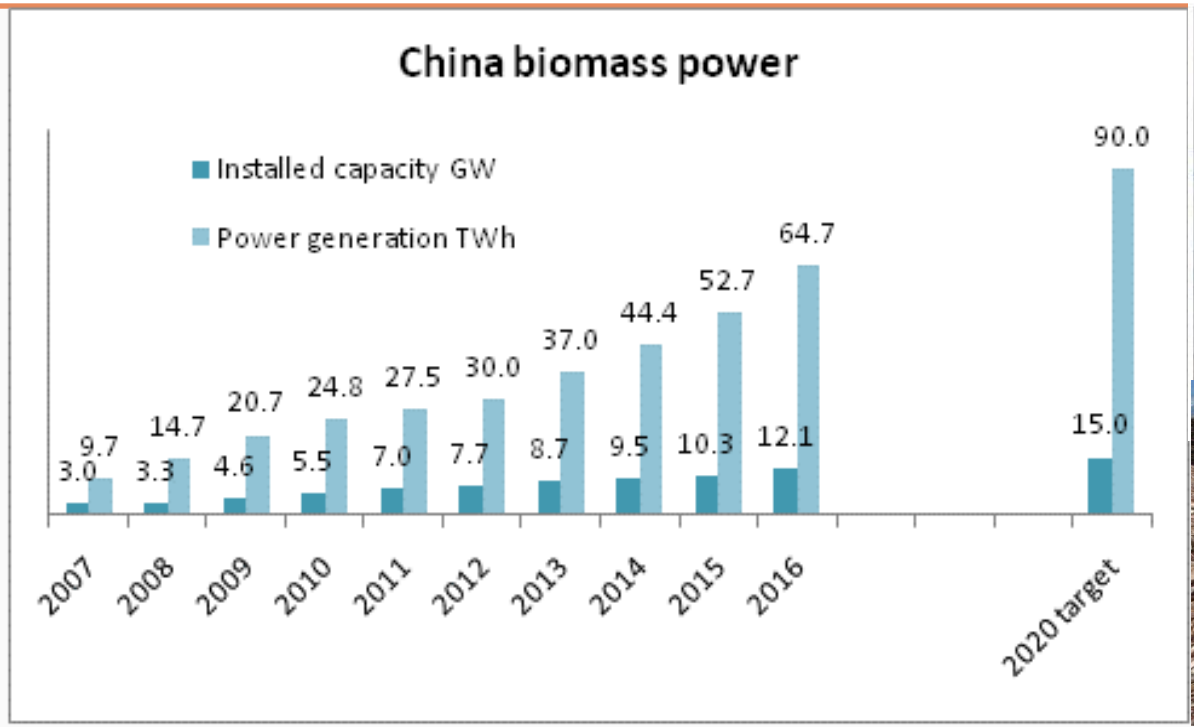
By the end of July of 2017, cumulative PV power generation was 113.94 GW, among them, the Centralized PV 90.48GW, accounts 79%. Distributed PV 23.46GW, 21%.

China's Solar Power Development- Generation



By the end of 2016, its cumulative power generation was 66.2TWh, accounting for 1.07% of the total power generation, with year-on-year growth of 72%.
In July of 2017, its cumulative power generation was 11.07TWh.

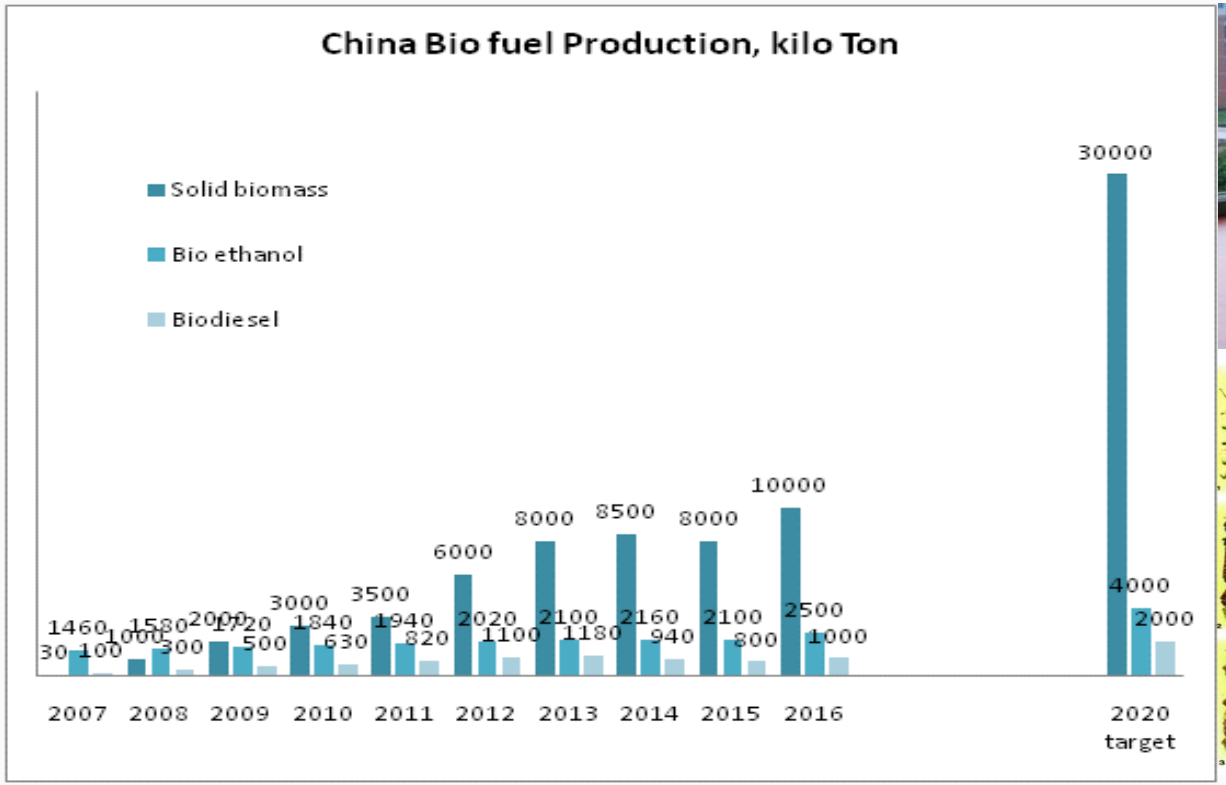
China's Biomass Development - Installed Capacity and Generation



The installed capacity of biomass power generation has grew steadily in China. By the end of 2016, the integrated capacity of biomass power generation was 12.14 GW, and its annual power generation was 64.7TWh.

By the end of July of 2017, The total installed capacity reached 13.70GW, and the cumulative power generation from January to July was 42.77TWh.

China's Biomass Development- Solid and liquid Bio-fuel.



By the end of 2016, the amount of Solid Biomass 10000 Kilo Ton, Bio ethanol 2500 Kilo Ton, Biodiesel around 1000 Kilo Ton。

Characteristics of China's RE Development

- 快速成长:例如风电，从起步到世界最大仅仅用了十年左右
  Growing fast: ie. Wind power-10 years from a beginner to the world 1st

- 产业链完整：从研发-制造-市场应用
  Full industrial chain: R&D-Manufacture-End-use Market

- 完全开放：市场投资完全对国内外开放
  Full openness: open market for foreign investments

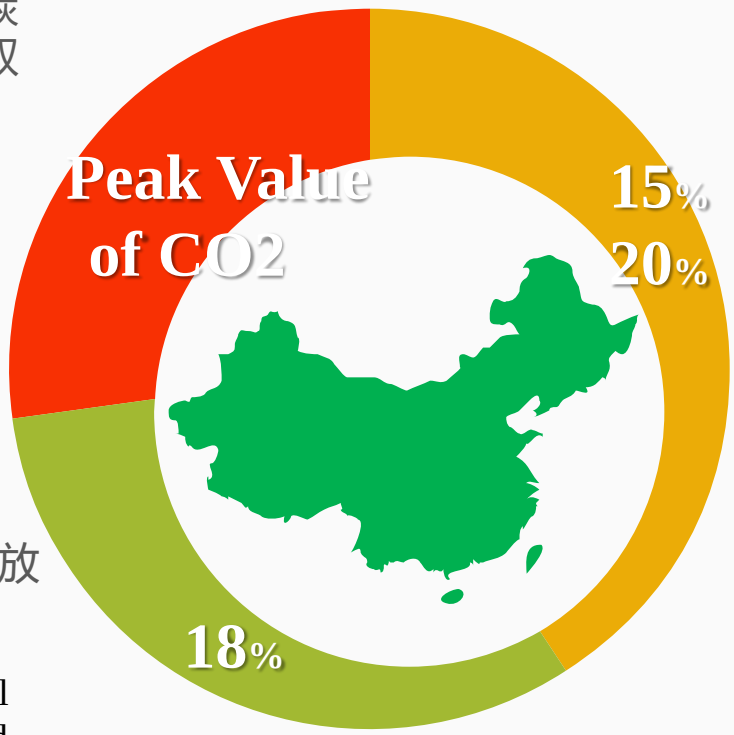
“十三五”可再生能源发展目标（2016-2020）

Goals of China’s RE Development during the 13th Five Year Plan (2016-2020)

Determination of Energy Transformation

2030年左右使二氧化碳排放达到峰值，并争取尽早实现。

By around 2030, CO_2 emissions will reach the peak, and the goal will be strived to achieve as soon as possible.



2020年非化石能源占一次能源消费比例达到15%，2030年达到20%。

By 2020, the proportion of non-fossil energy in primary energy consumption will reach 15%, and by 2030 20%.

2020年单位GDP二氧化碳排放量较2015年下降18% 。

CO_2 emissions of per unit GDP will decrease by 18% in 2020 compared to 2015.

RE Development Objectives during 13th Five Year Plan

- Hydropower： By 2020, the installed capacity will reach 380GW.
- Wind power: By 2020, the installed capacity of grid connected will reach 210GW, and effectively solved the curtailment issues.
- Solar power: By 2020, the installed capacity of grid connected will reach 110GW, including 105GW of PV and 5GW of CSP. And in the meanwhile, realizing parity integration in the demand side for PV power.
- Biomass Energy: By 2020, the integrated capacity of biomass power generation was 15GW, the amount of Solid Biomass reach 30000 Kilo Ton, Bio ethanol 4000 Kilo Ton, Biodiesel around 2000 Kilo Ton。

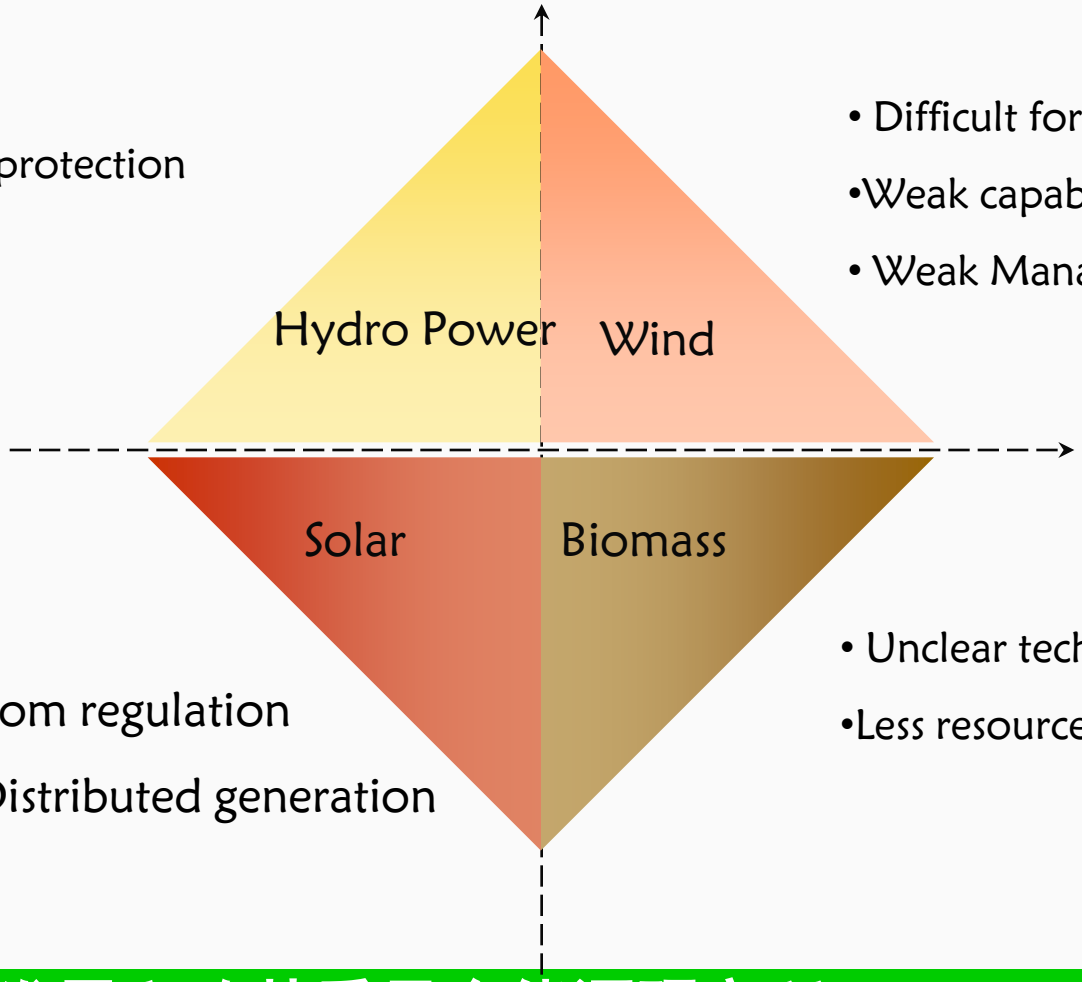
中国可再生能源产业发展政策

Policy Recommendations for RE Development

RE Scale-up Development and Barriers

Difficulties in technology, economy of scale and mechanisms

- Immigration
- Environment protection
- Mechanisms



- Difficult for grid-connection
- Weak capability for innovation
- Weak Management

- High Cost
- Weak support from regulation mechanism for Distributed generation

- Unclear technology roadmap
- Less resources

The Main issue Facing China' RE is the Curtailment

In 2016, the curtailed electricity amount in Yunnan and Sichuan was 40TWh and 26TWh respectively.

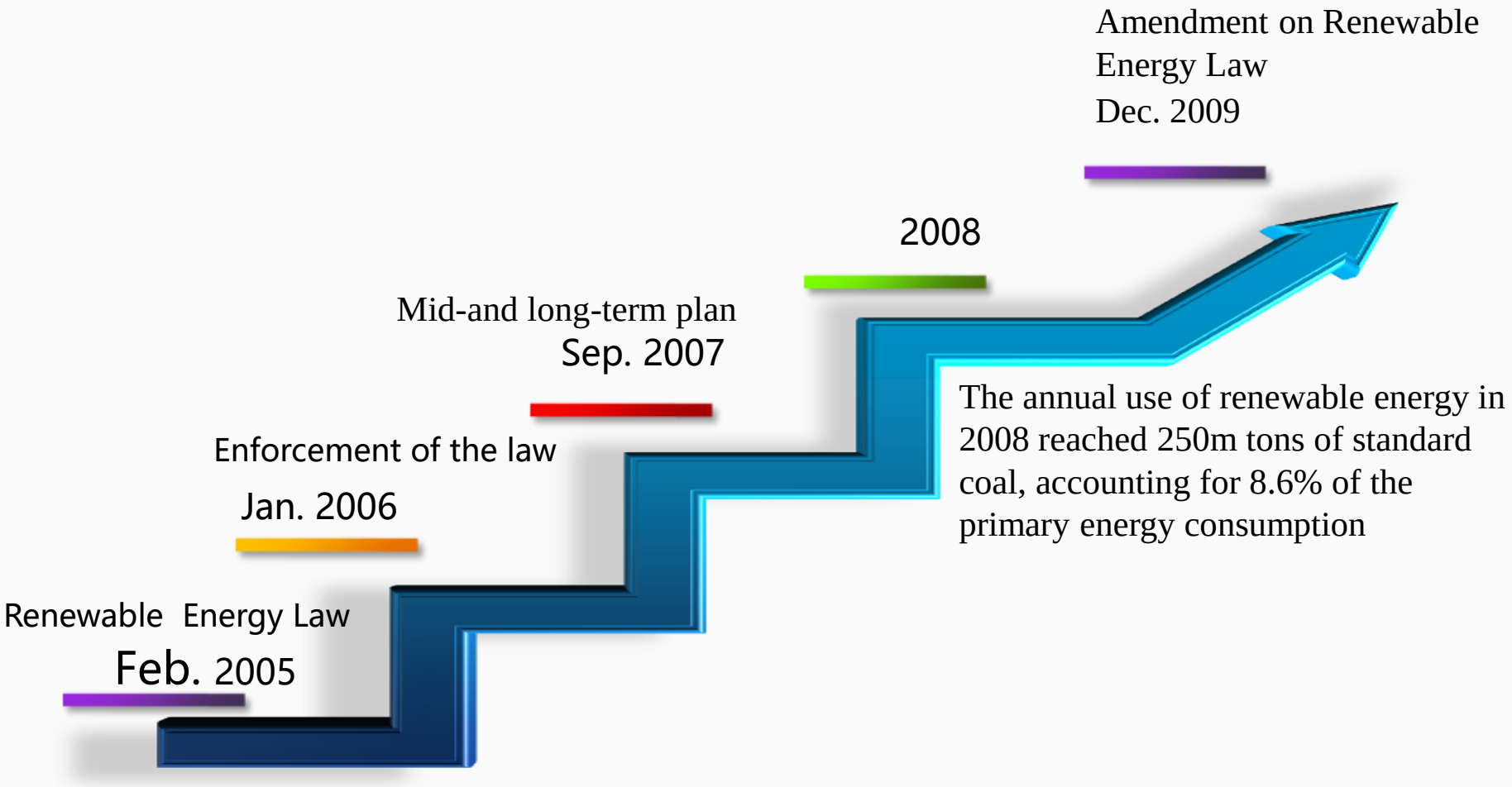
In 2016, the total curtailed electricity amount of wind power hit 49.7TWh. In Gansu Province, the curtailed rate of the wind power was 43%。

In 2016, the total curtailed electricity amount of PV power hit 7.4TWh, the curtailed rate of the PV power was 11%. In Gansu, Xinjiang, Qinghai, Inner Mongolia, Qinghai, Shan'anxi, the five north-west area Province, the curtailed electricity was 2.6TWh, 2.9TWh,0.8TWh, 0.5TWh, 0.4TWh and 0.5TWh respectively.

2016年，the average use time of power-generating equipment was only 1742 hours for wind power, for PV, it was only 997 hours. Compared with the level(wind power 1800 hours, PV 1500 hours) specified by NEA, the lag is too far.

what is noticeable is that the curtailed nuclear power reached 46.2TWh.

History and Impetus of Policies on RE industry



History and Impetus of Policies on RE industry

China RE Policy System

- 2005.2 Renewable Energy Law announced
- 2006.1 RE law took effects
- 2007.9 RE long & medium term plan
- 2009.9 15% Non-fossil energy target
- 2009.12 Amendment of Renewable Energy Law
- 2010.9 Solutions on Strategic Emerging Industries
- 2012.7 RE 12th Five Year Plan
- 2016.12 RE 13th Five Year Plan …… ……

China RE Law

13th Five Year RE Plan Put Forward Four Comprehensive Policies

To Establish a goal-oriented management system for the development and utilization of renewable energy.

To implement the system of guaranteeing the purchasing of electricity generated by using renewable energy resources in full amount

To set up Green certificate trading mechanism for renewable energy. NDRC and NEA jointly issued the Notification of the certification of green certificates for renewable energy and the system of voluntary subscription trading, on January 1, 2017.

To strengthen supervision over renewable energy. Carry out special supervision work on renewable energy, the collection and distribution of subsidized funds, project construction progress and project quality, and grid access of projects.

13th Five Year RE Plan Put Forward Four Comprehensive Policies

June 7, 2017, China Green Power Consumption League founded. Invited Shen Xue and Zhao Hongbo, the figure skating couple, won the gold in 2002 World Figure Skating Championships as the image ambassador.

13th Five Year RE Plan Put Forward Four Comprehensive Policies

July 1,2017, NEA held the Launching Ceremony of the Green Electricity Certificate

13th Five Year RE Plan Put Forward Four Comprehensive Policies

At present, the green power market is still small in China, but we believe that it will actively play a significant role for the scale-up development of China's renewable energy .

谢 谢！

Thanks!