

Renewable Energy in China

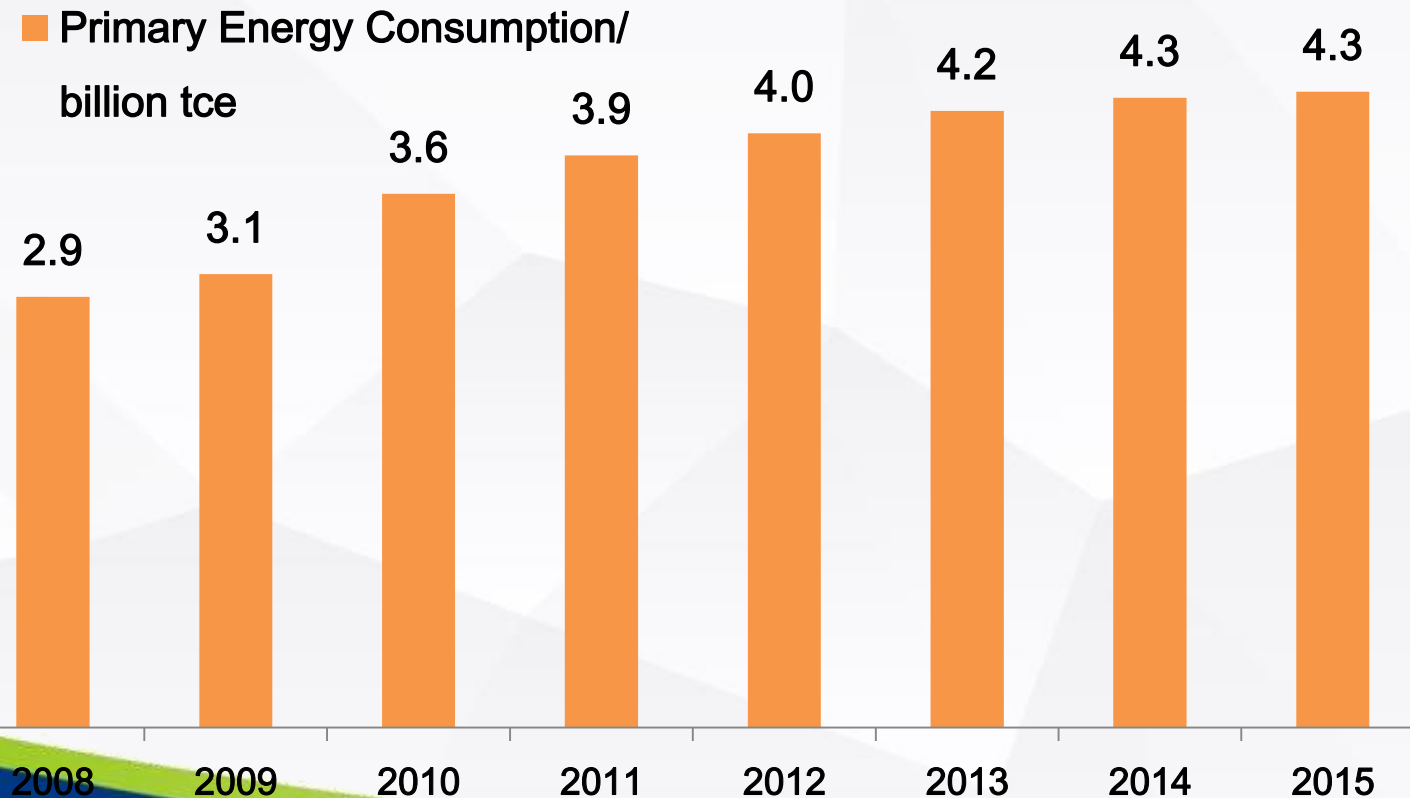


Liu Jiandong, Sun Peijun
China National Renewable Energy Centre
2016/12/15

China's Energy Consumption



China's energy consumption continued to grow in many successive years, reaching 4.3 billion tce, and it has become the world's largest energy consumer.



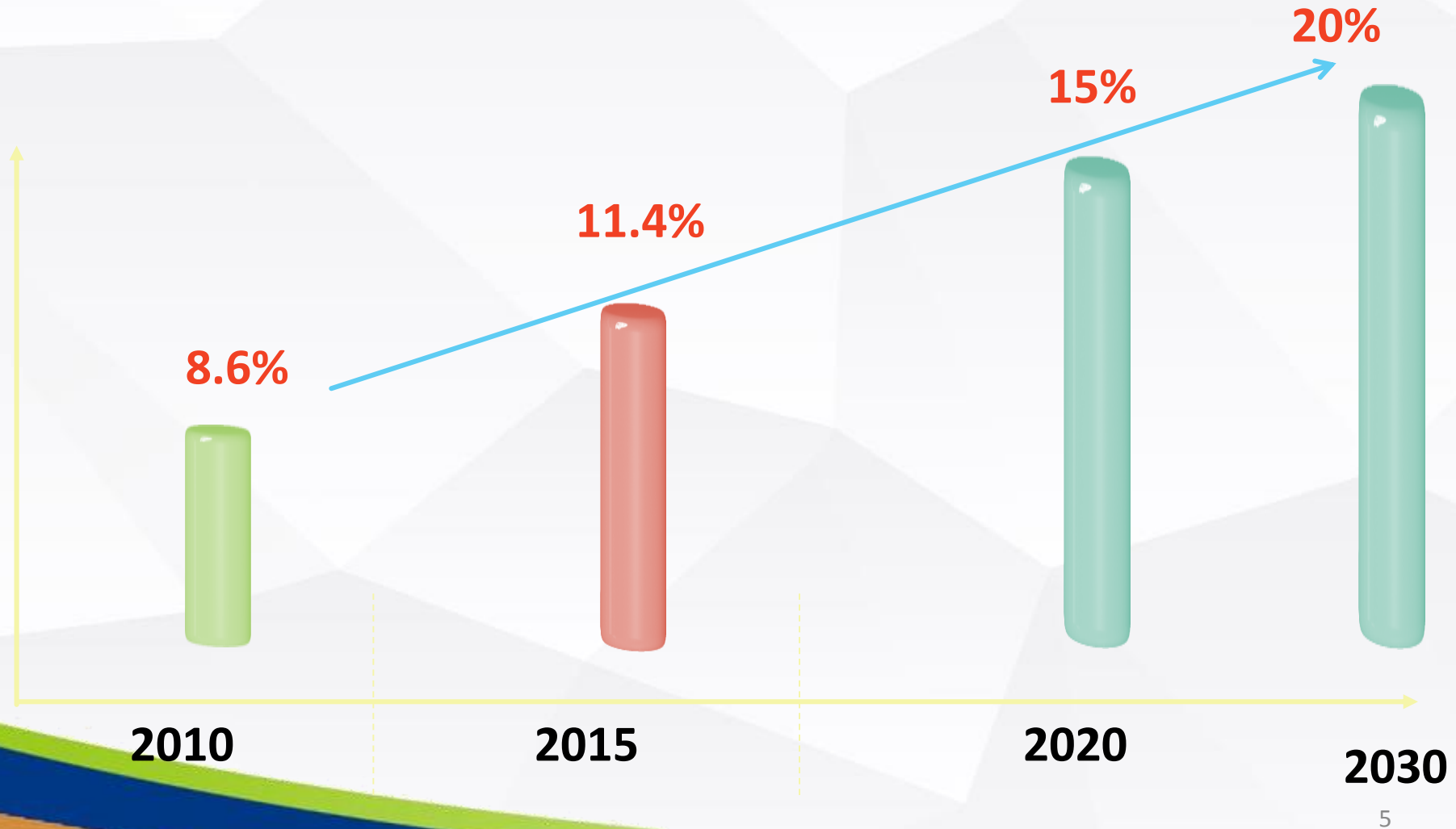
CHINA'S ENERGY CONSUMPTION STRUCTURE



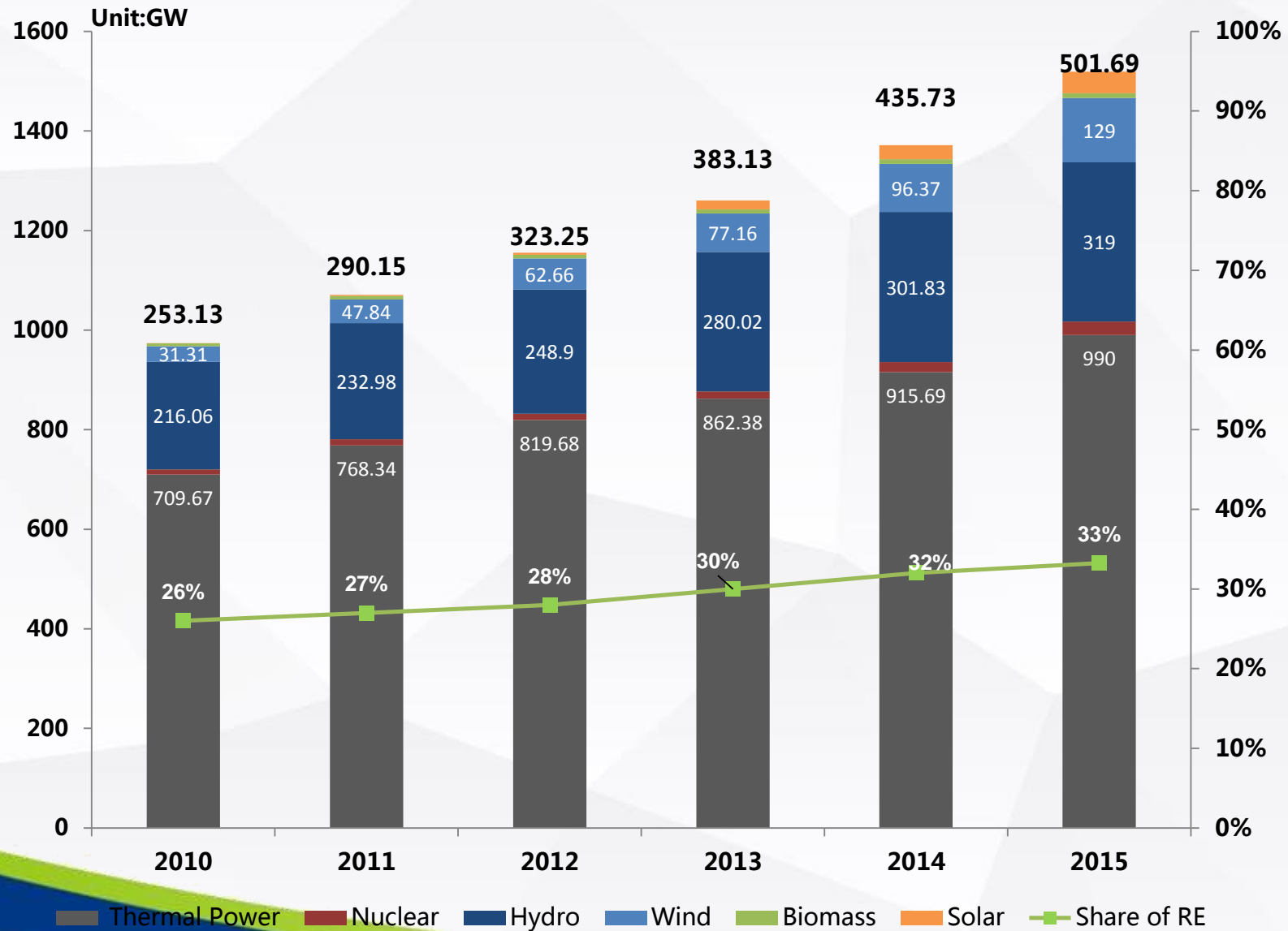


China's New Energy Development Status and the Future Plans

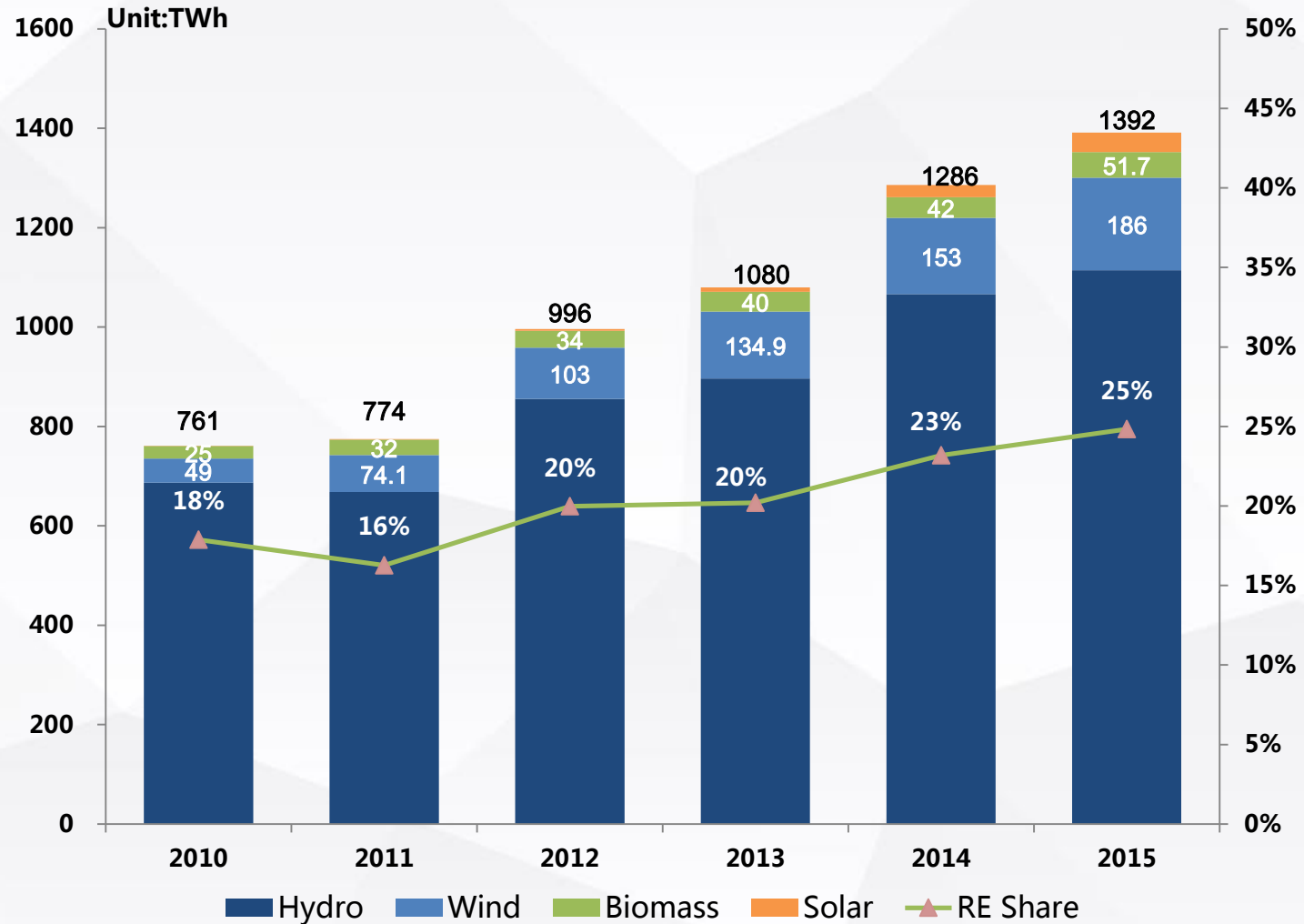
NON-FOSSIL ENERGY TARGET



CHINA'S POWER CAPACITY STRUCTURE



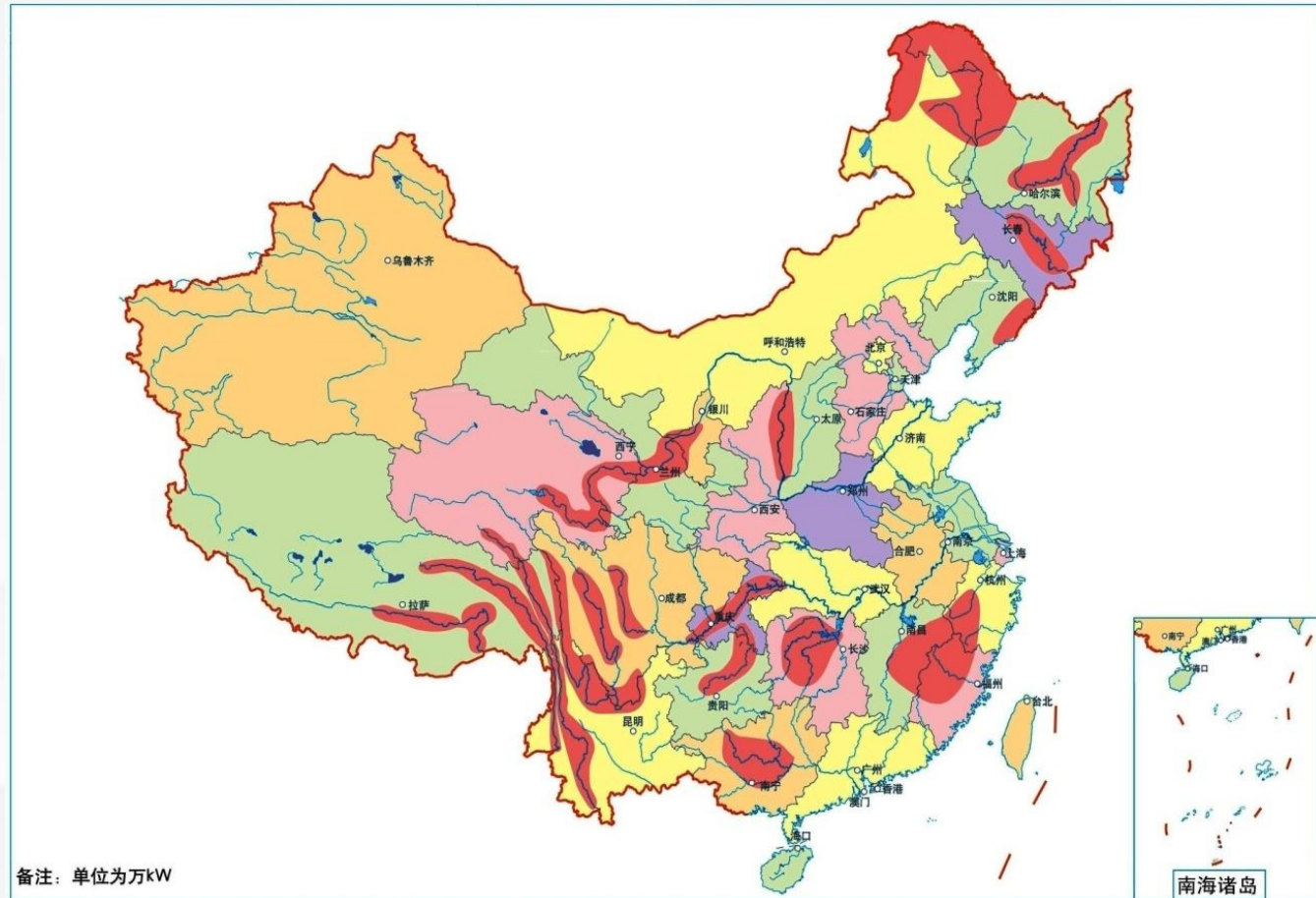
CHINA'S RE POWER GENERATION STRUCTURE



HYDRO—RESOURCES OVERVIEW



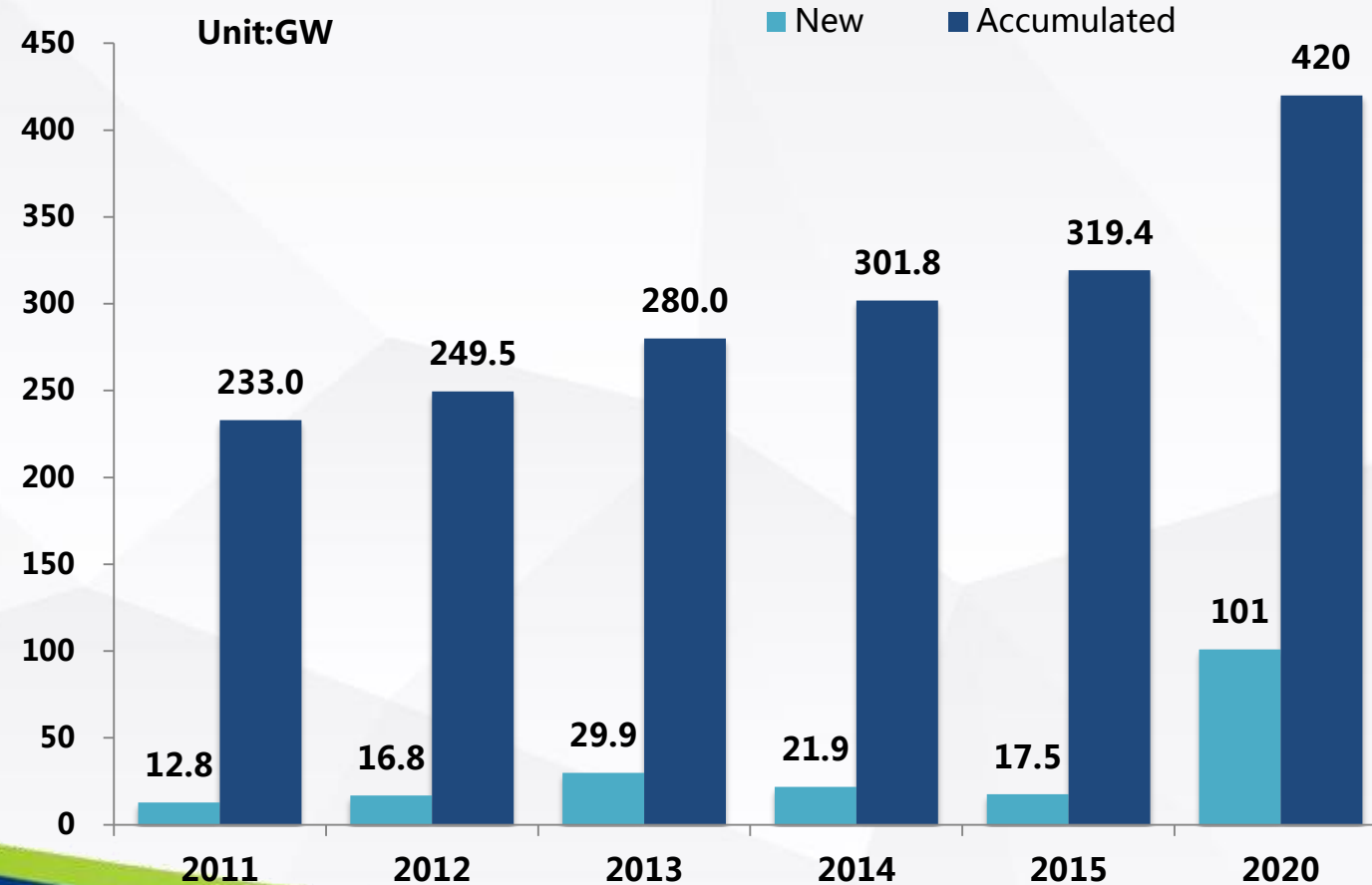
- ▶ Rich in resources: potential capacity of 660GW, potential annual generation of 3000TWh.
- ▶ Mainly distributed in major rivers of China's Western area, where Sichuan Yunnan and Tibet account for 60% of its total resources
- ▶ China implemented the “west-to-east electricity transmission strategy” since the major power load is concentrated in eastern areas.



Hydro Power—Development Status



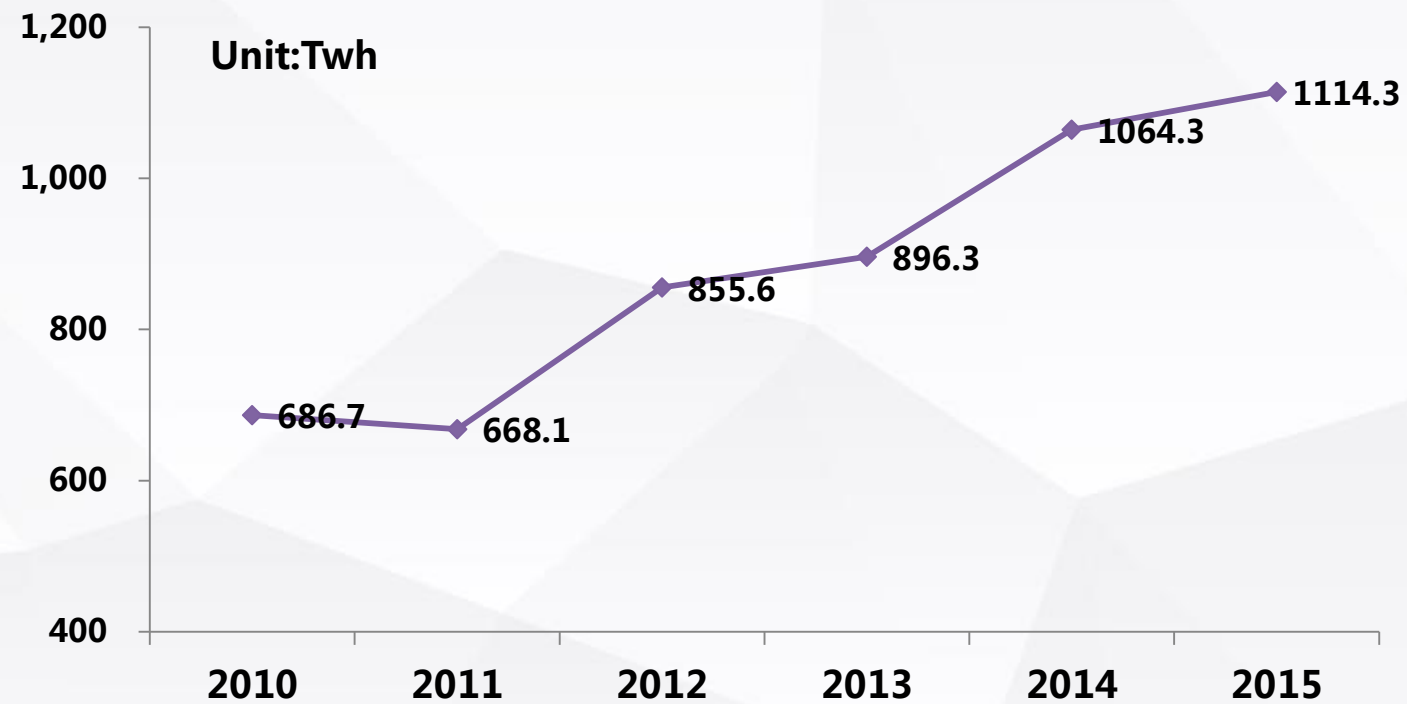
- Accumulative capacity installations in 2015: 319 GW, increased by 4% ;
- By 2020, it is estimated to have 420GW hydro power installations in total



Hydro Power—Development Status



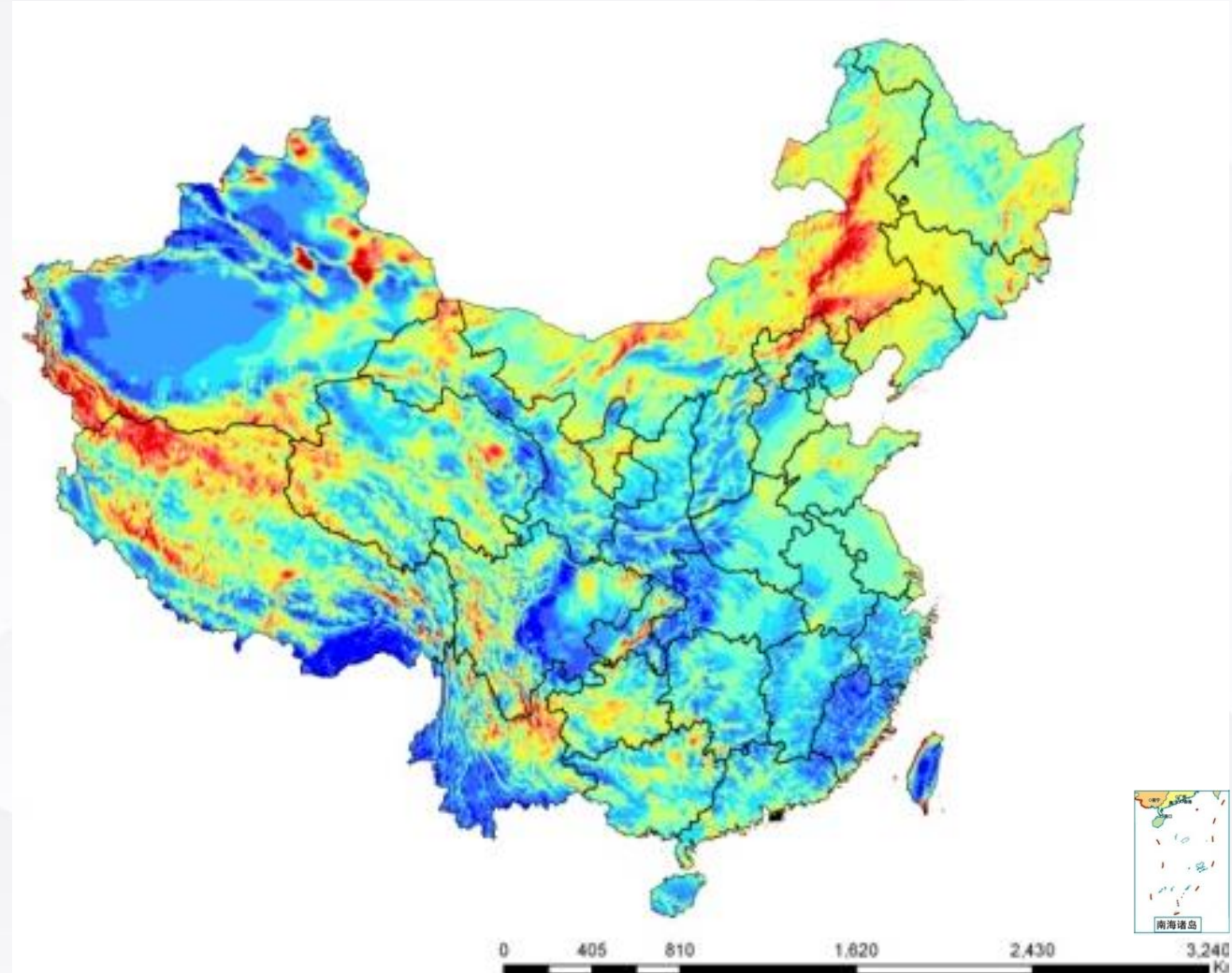
- The power generation in 2015: 1114.3 TWh, increased by 3%.



Wind —Resources



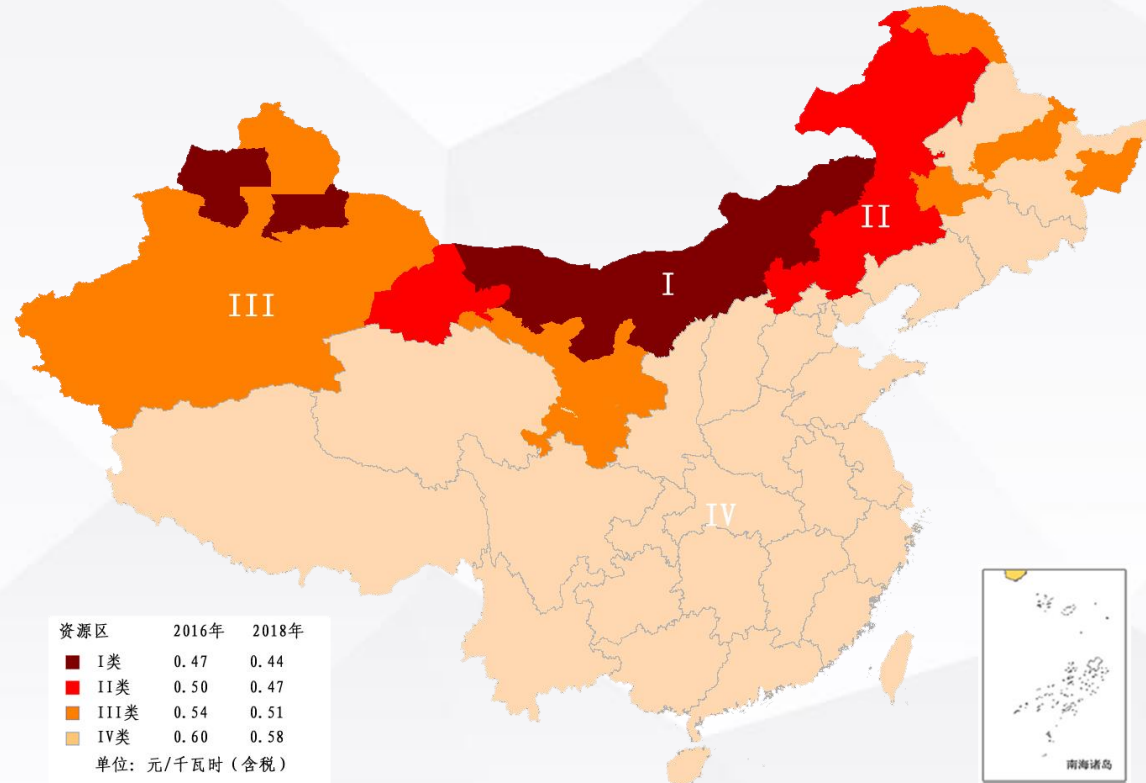
- China is rich in wind resources, with its onshore technical available potential of 7.5TW (wind density capacity $\geq 300\text{W}/\text{m}^2$).
- Offshore wind capacity at water depth of between 5-25 m (above 100m height) : 190 GW and 320 GW at water depth of between 25-50 m



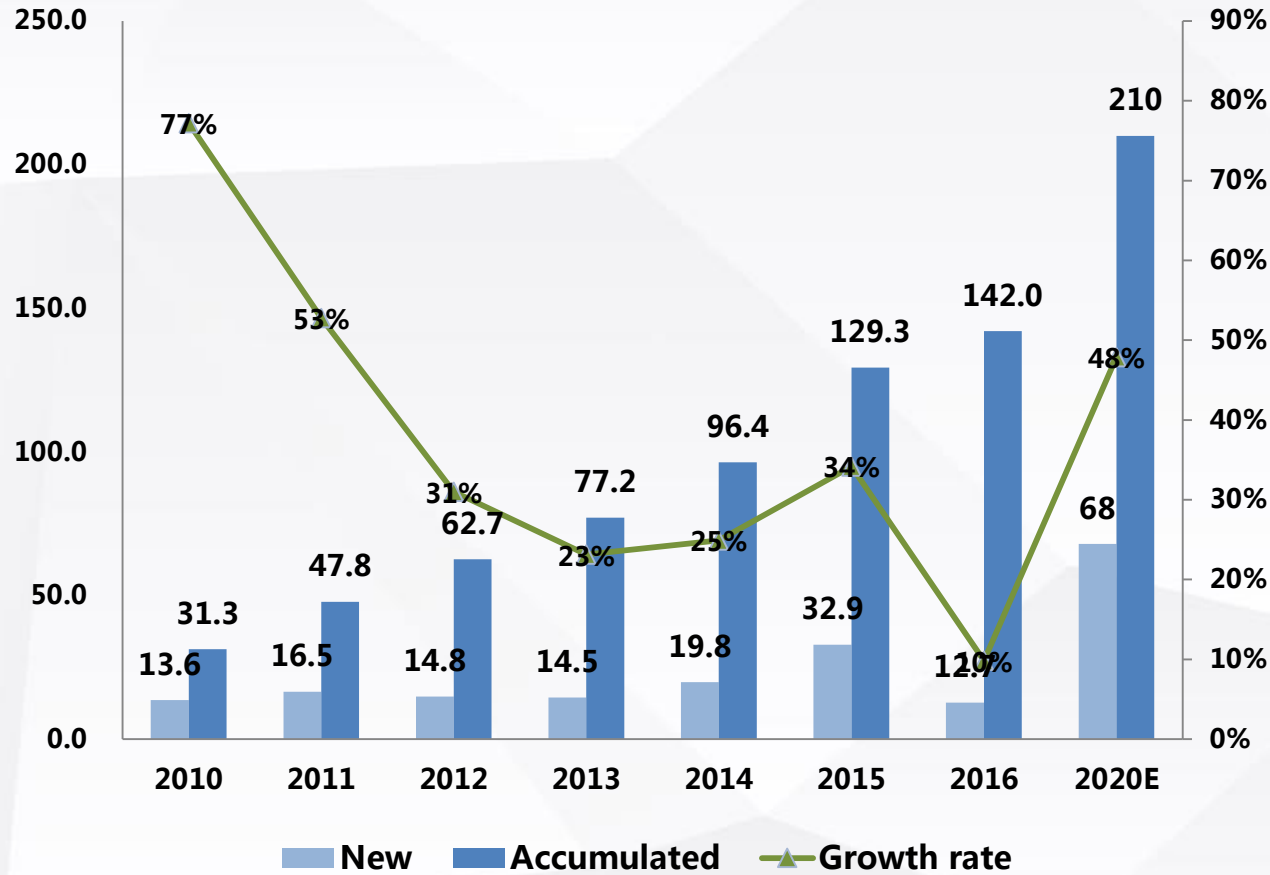
Wind power FiT policy



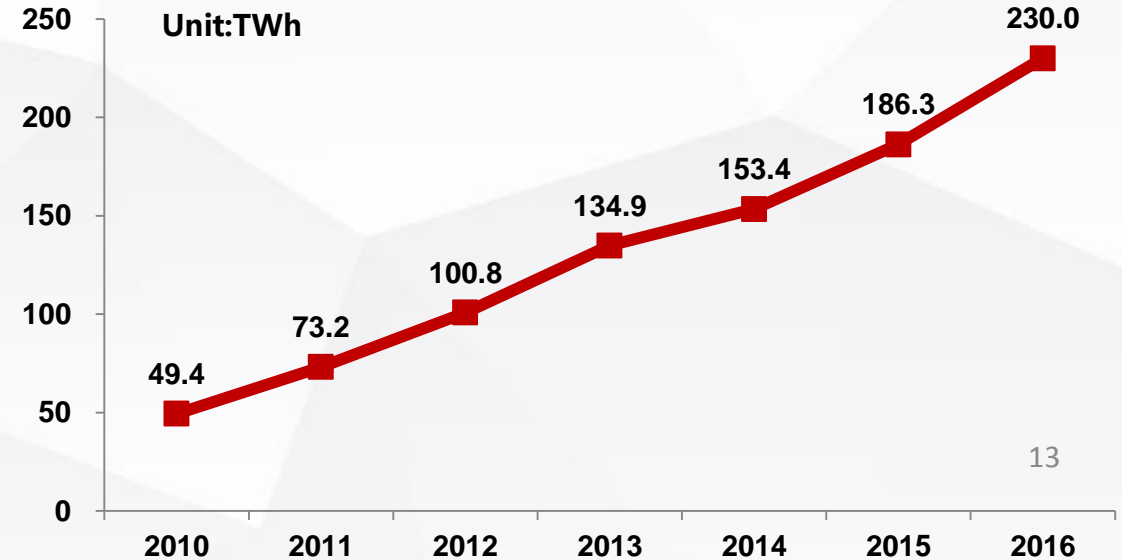
- Updated onshore power pricing based on costing reduction:
 1. For first-class, second-class and third-class resource areas: the wind power price reduced by 0.02CNY/kWh in 2016 and 0.03CNY/kWh in 2018
 2. For Fourth-class resource area: the wind power price reduced by 0.01CNY/kWh in 2016 and 0.02CNY/kWh in 2018
- Offshore wind power pricing keep unchanged, FIT with 0.85CNY/kWh commissioned before 2017 and tidal wind power with 0.75CNY/kWh。



Wind power development status



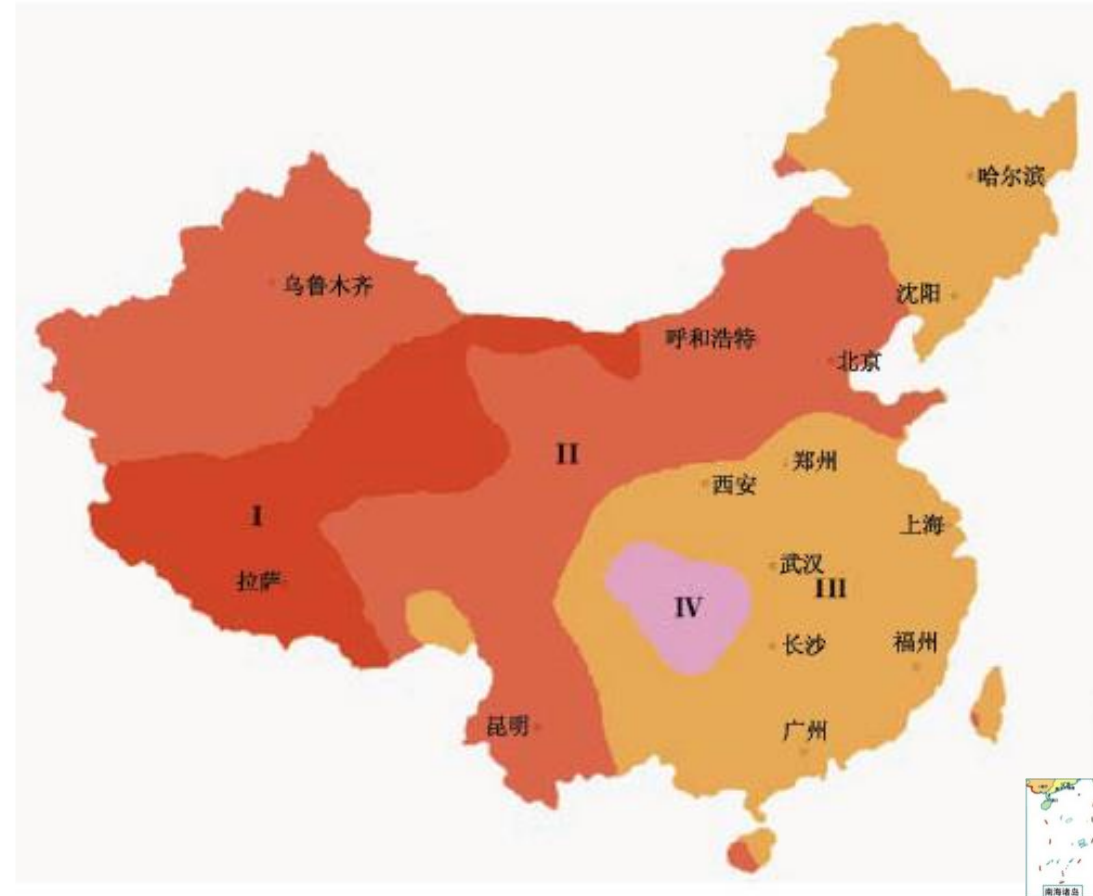
Estimated 142GW grid-connected wind power installations in 2015;
 Annual electric power more than 180TWh, top three power source;
 560MW Offshore wind installations, 5GW Offshore will be installed



SOLAR ENERGY—RESOURCE OVERVIEW



- ▶ Solar energy resources are abundant in China. The territorial area and buildings' light receiving areas suitable for solar generation are vast.
- ▶ Solar resource-rich regions accounted for two-thirds of land area, and it has huge resource potential for large scale development and utilization of solar energy.



Solar PV power pricing policy

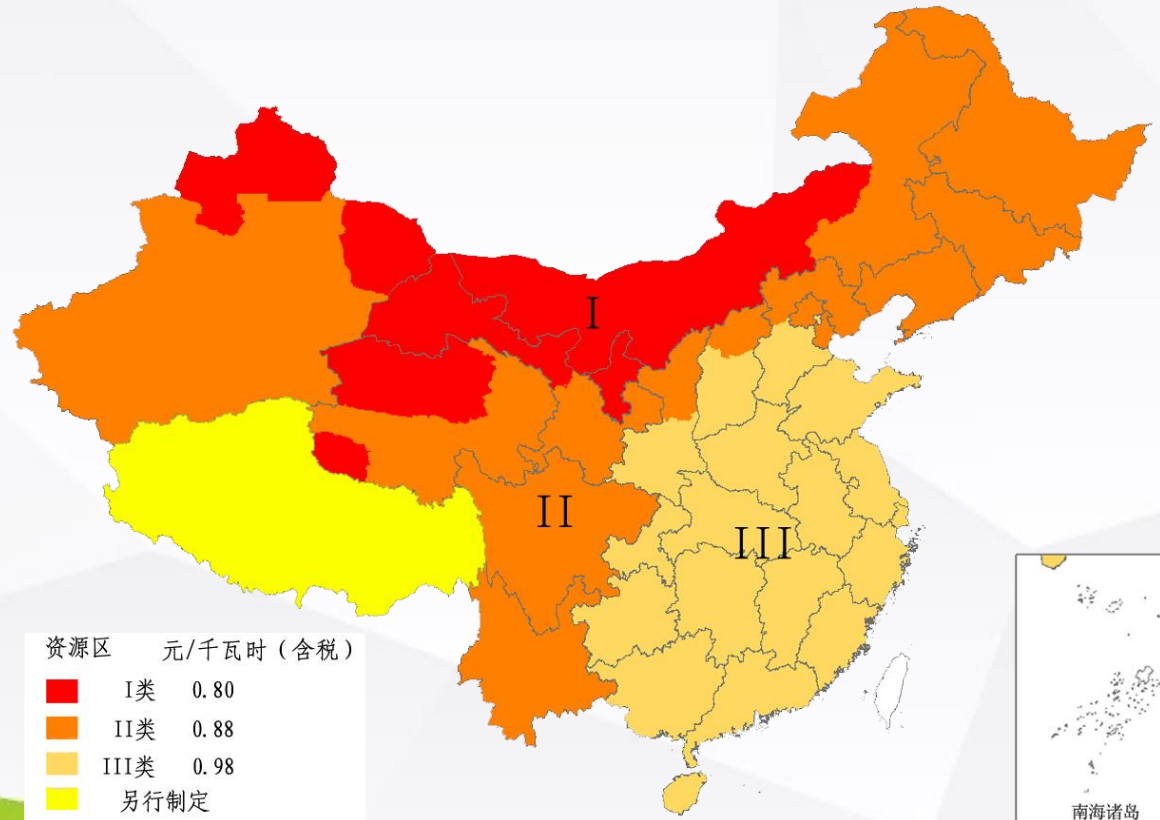


New solar PV power pricing in 2016:

FIT in first-class resource area: 0.80CNY/kWh, reduced by 0.10CNY

FIT in second-class resource area: 0.88CNY/kWh, reduced by 0.07CNY

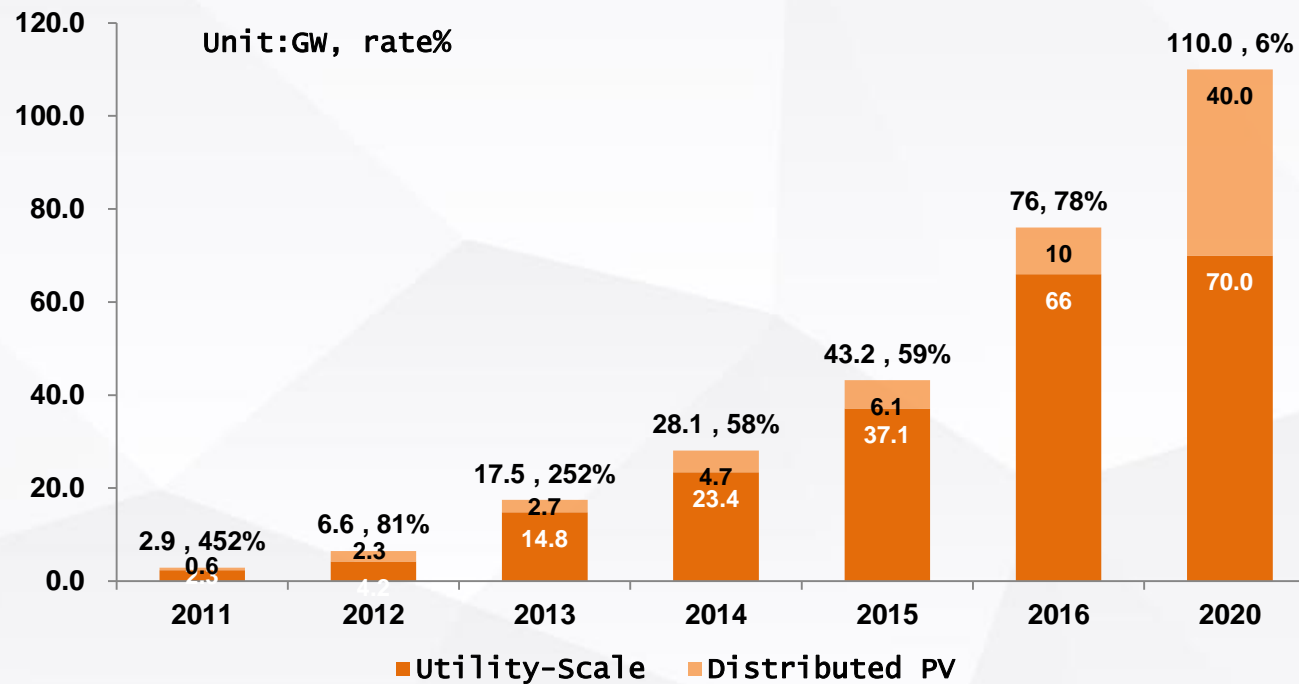
FIT in third-class resource area: 0.98CNY/kWh, reduced by 0.02CNY





SOLAR ENERGY DEVELOPMENT STATUS

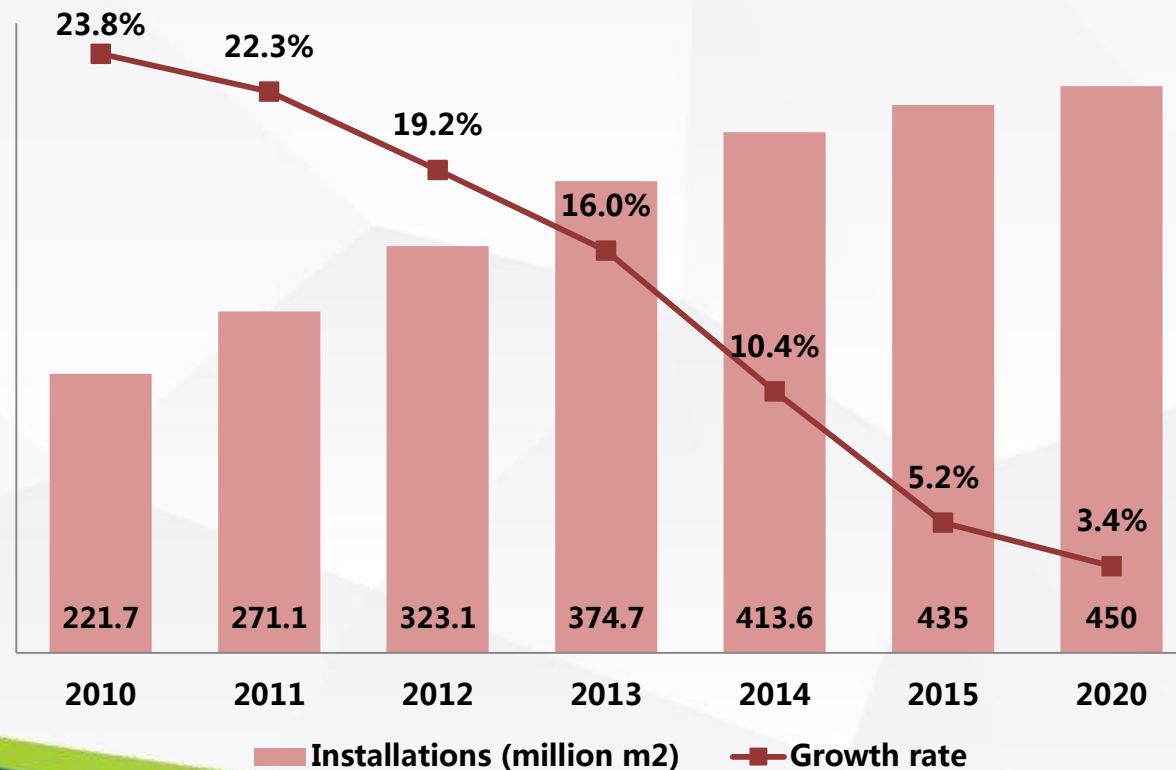
76GW grid-connected Solar PV installations in 2016, 65GW Utility-Scale, 7GW distributed PV. Annual electric power more than 41TWh. By 2020, 10 GW CSP



Solar energy development status



China is large country with solar heating utilization and solar heating collection area reached 450 million square meter in 2015, increased by 3.4% compared with 2014. By 2020, Solar heating will reach to 450 million square meter and 400 million square meter in industry sector



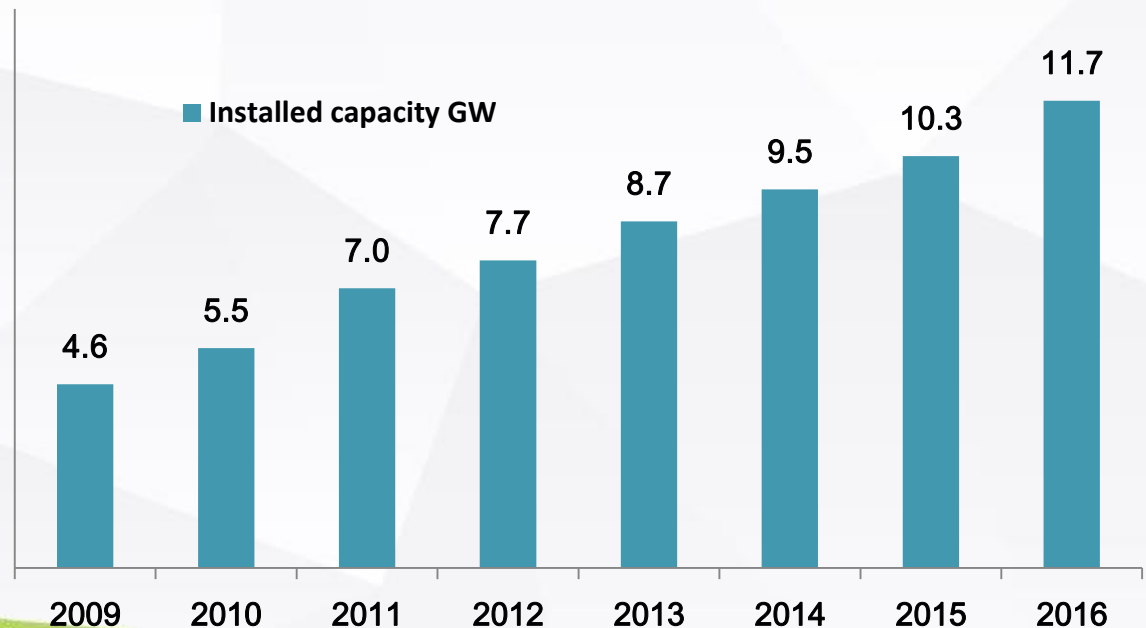
BIOMASS—RESOURCES



The installed capacity of biomass is estimated to reach 12GW in 2016, with its generating capacity of more than 60TWh.

- ▶ The utilization availability of agricultural waste is 195 million tce per year
- ▶ The utilization availability of forestry waste is 198 million tce per year
- ▶ The utilization availability of municipal waste, livestock breeding waste and high concentration organic wastewater is 45 million tce per year

China biomass power



Biomass—development status

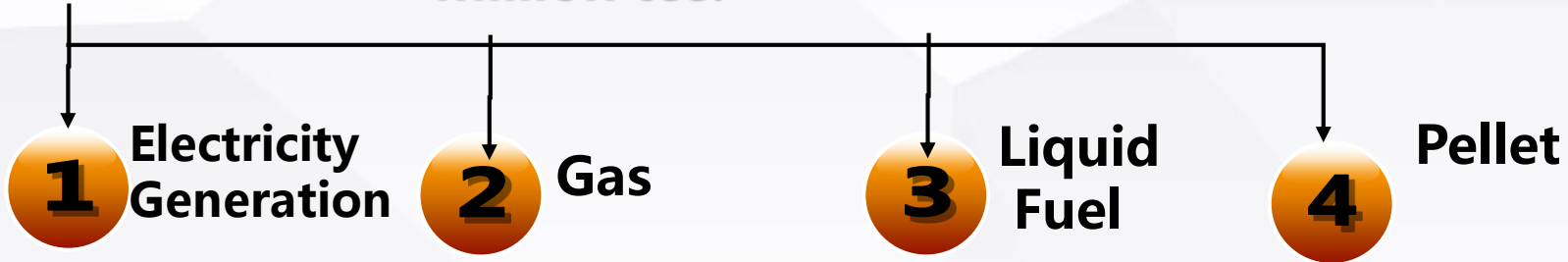


Biomass layout



Objectives:

By 2020 productions of biomass will reach 100 million tce.



- 15GW of installed capacity
- Focus on major grain producing areas

- Annual use of 800 billion cubic meters of biogas

- Annual use of fuel ethanol reaches 4 million tons, annual use of biodiesel reaches 2 million tons

- Annual use of Forestry biomass briquette reaches 25 million tons



Thanks!
谢谢!