

Low carbon development in China

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Major commitment to Paris Agreement

- China approved the Paris Agreement on September 3 , by People's Congress
- By 2020, carbon intensity decrease 40-45% compared to 2005, and the non-fossil energy contribute 15% of the total primary
- By 2030, carbon emission peaked, carbon intensity decrease 60-65% than 2005, non-fossil energy reach 20% of the total primary
- These commitment must to be achieved
- The carbon intensity target of 2020 will be, most likely, overfulfiled
- Carbon emission earlier peak will be possible

Decrease the carbon intensity

- Three major aspects of low carbon efforts in China
 - Energy conservation
 - Replace the coal by natural gas and others: energy mix adjustment
 - Non-fossil energy development
- Energy conservation is the major contributor for low carbon target
- Coal decrease is the key for earlier peak of carbon
- Non fossil energy is the longer target for low carbon system

Development is still the major subject

- China will do the best to keep on relative high economic growth rate
- 6.5-7% annual growth rate of GDP before 2020, and wish to keep on similar rate after 2020, such as 6% until 2030
- Current per capita GDP is around 8000 US dollars, more than 25000, or even more, by 2050 is expected
- Urbanization still has long way to go, currently more than 45% of population living in rural area
- Very high investment rate, annual fixed assets investment reach 8.646 trillion US dollar in 2015, still increase annually
- Energy consumption will increase for long

Economic development needs new innovation

- General production capacity expansion up to ceiling, over supply become common
- Infrastructure construction scale peaked
- International trade of general goods saturated
- Environmental pollution become hard constraints of expansion style development
- Raw material peaked as a total
- Economic structural change become necessary
- Energy consumption growth rate slower down significantly, due to the economic growth pattern change

Comprehensive energy conservation policy

- National target of energy intensity decrease set up for each Five Year Plan as legally binding target for social and economic development
- Target allocated to each provinces, cities and counties, as well major sectors, annually and for Five years
- More than 10,000 big enterprises signed energy conservation agreement with government
- Several national wide energy conservation programs developed and implemented
- Industrial sectors have been focused for energy efficiency improvement
- Building and transportation sector are involved closely

Energy intensity decreased significantly

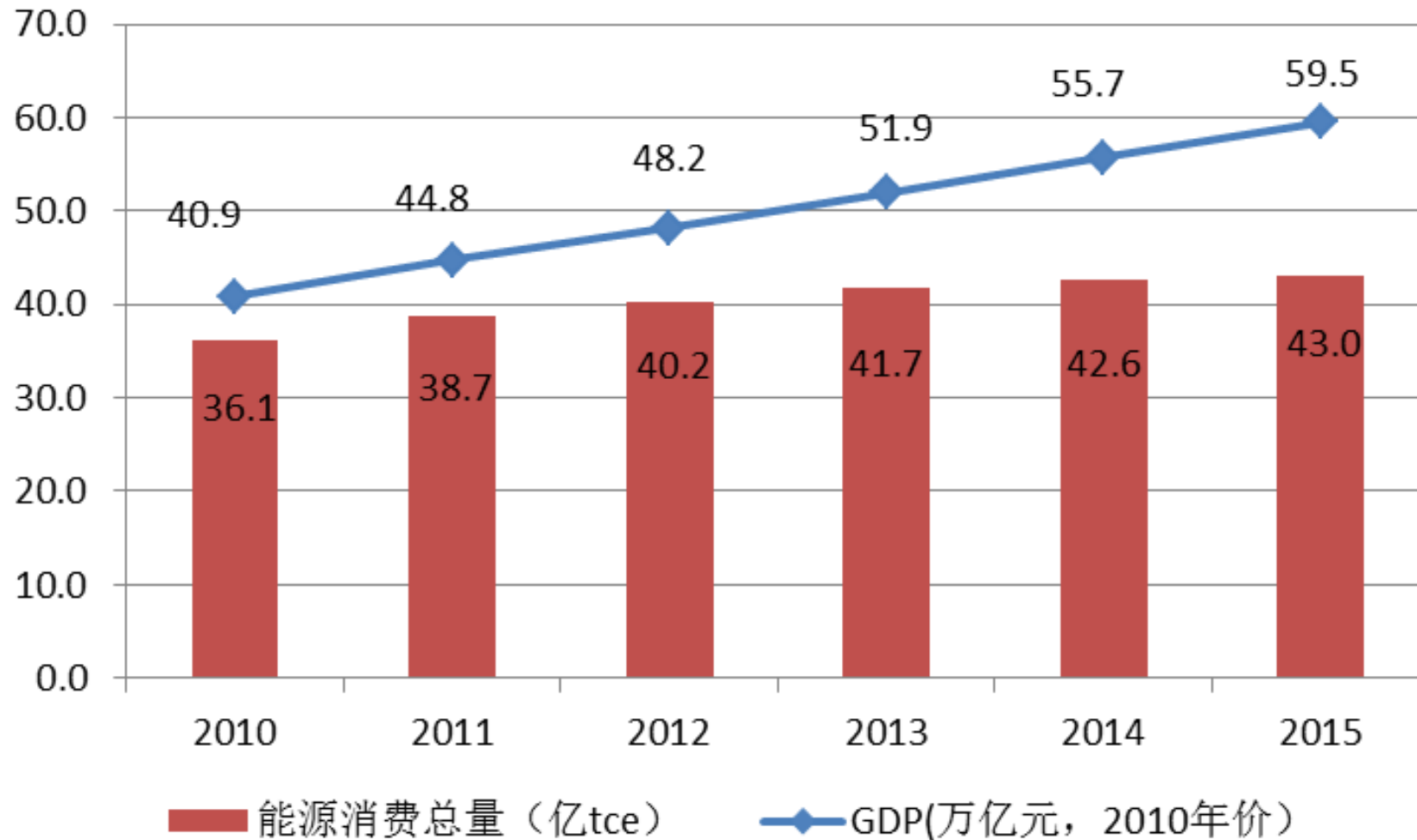
- Energy consumed for per unit of GDP decreased 19.1% and 18.2% during last two five years periods
- Annual improve rate 4.15% and 4% separately, much higher than the world average
- Energy efficiency technology introduced, developed and popularized
- Already take the lead in many sectors, such as power generation, iron making, aluminum making, cement production, etc.
- Building standard applied to cut the energy consumption by one half to three fourth
- Public transport first, and track traffic priority policy applied, electric car promoted

Energy conservation in heavy industry

- Target of expiring backward capacity completed earlier
- From 2011 to 2015, more than 75 mln tons steel, 69 mln tons of iron, 570 mln tons of cement, 152 mln standard box of glass production capacity have been expired
- Energy efficiency improved in major sectors:

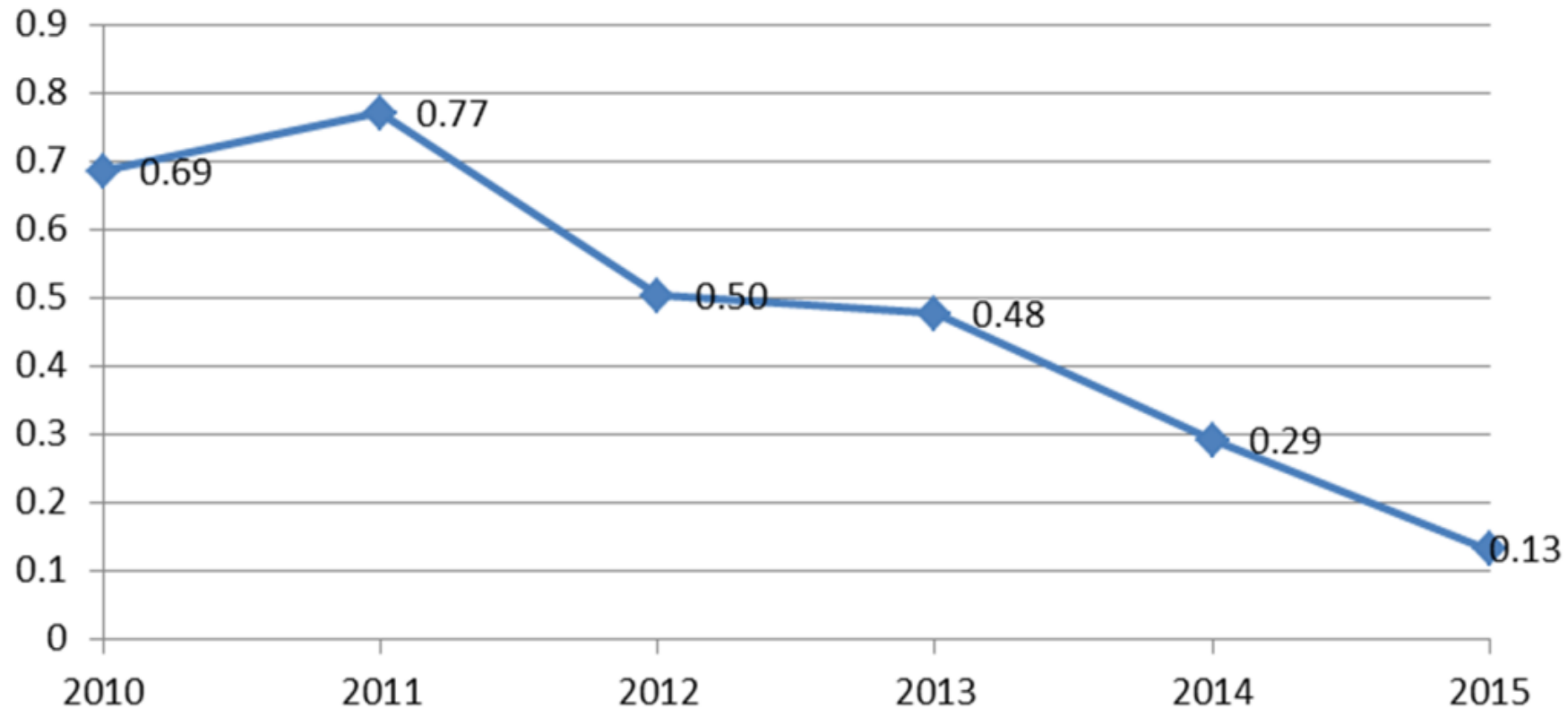
	unit	2010	2015	improvement
Coal for power generation	gce/kWh	333	315	5.4%
Electricity for aluminum	kWh/t	14013	13500	3.7%
Energy for cement	kgce/t	115	110	4.4%
Energy for ethene	kgce/t	886	835	5.7%

Decouple the Energy consumption and economic growth

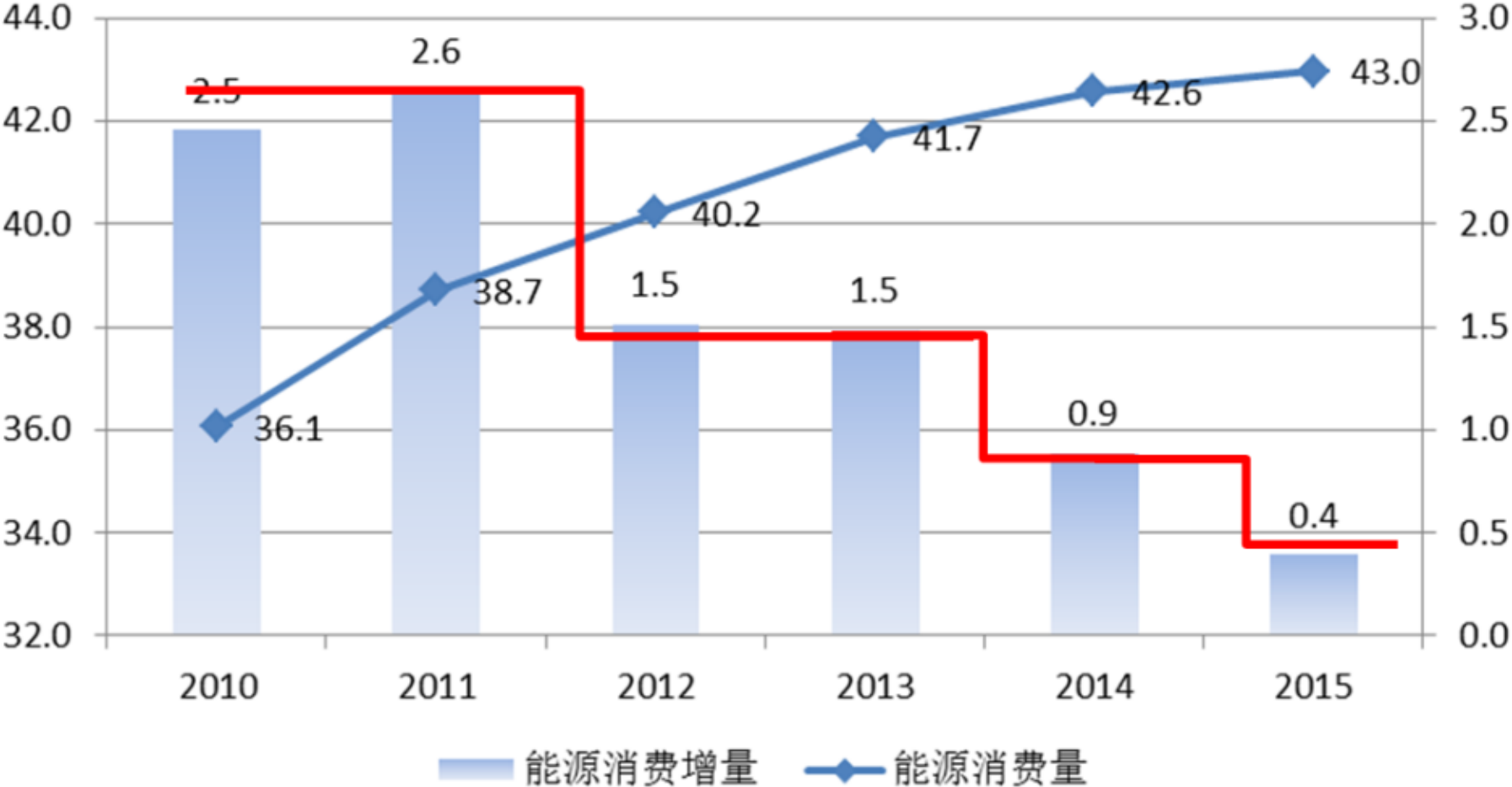


Energy consumption coefficient

能源消费弹性系数



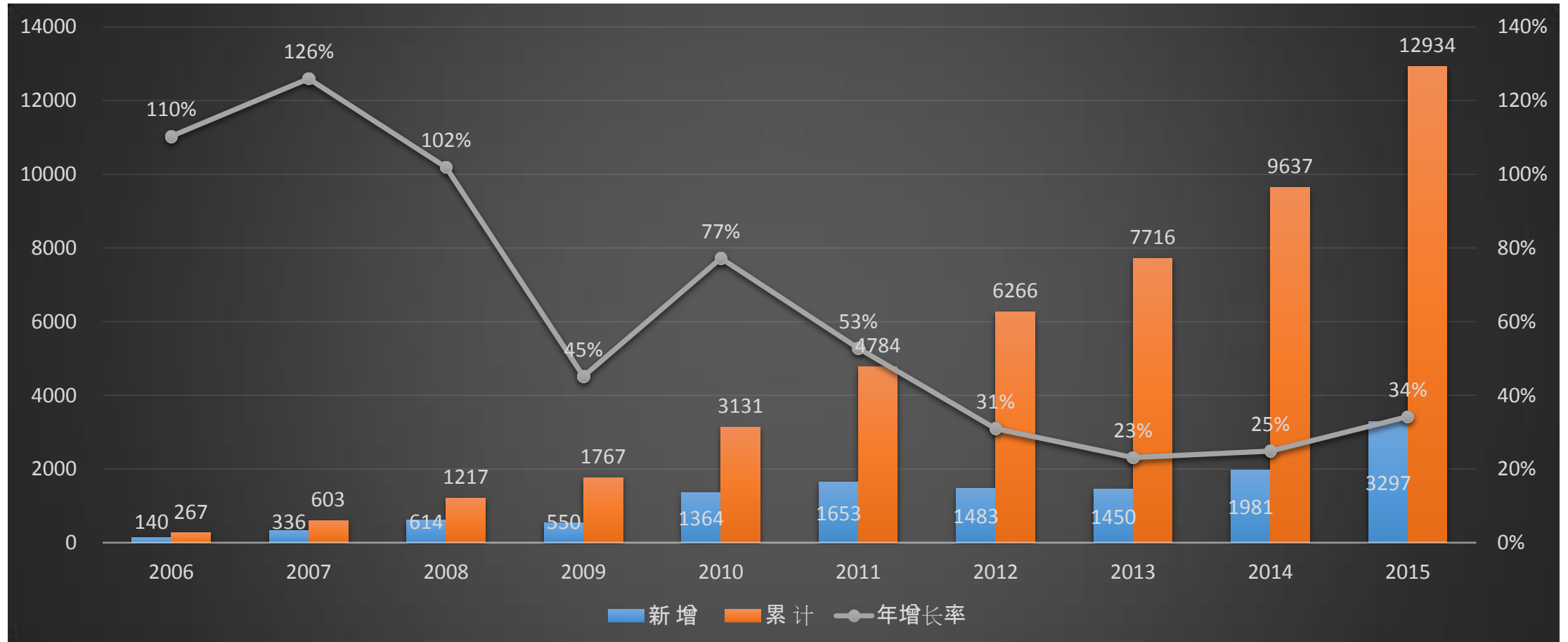
Increase quantity of energy consumption



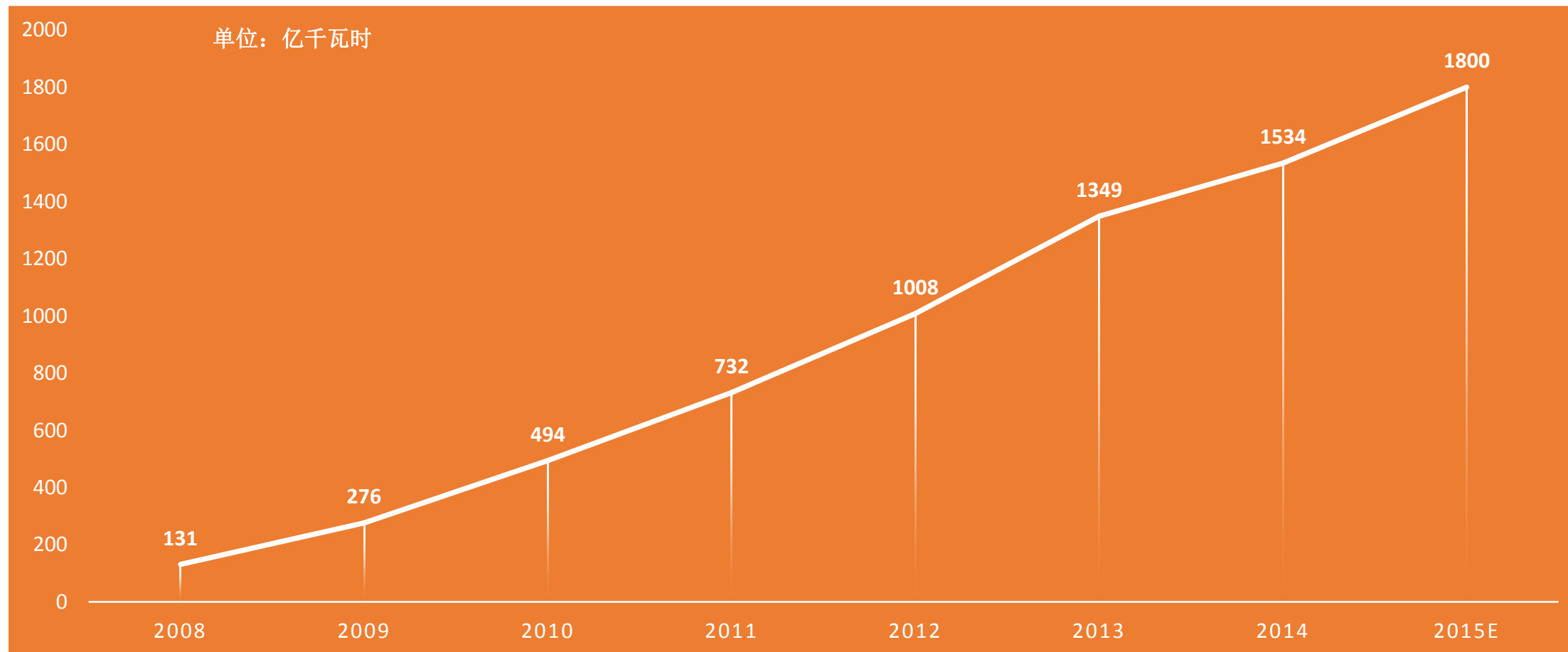
Non-fossil energy develop rapidly

- Large scale of nuclear power construction, near 30 generators under construction
- Develop and Introduce advanced technologies, including AP1000, EPR, domestic Hualong 1, HTR, FBR, CAP1400, etc.
- Rank the first in the world for generation capacity of hydro power(320 Gw), wind power (145 Gw), solar power (45Gw)
- Increased in 2015 hydro 15Gw, nuclear 6Gw, wind 32.45Gw, and solar 18.32Gw, the biggest increase in the world
- 2020 targets: 200Gw wind, 100Gw solar, 58Gw nuclear, 420 Gw hydro

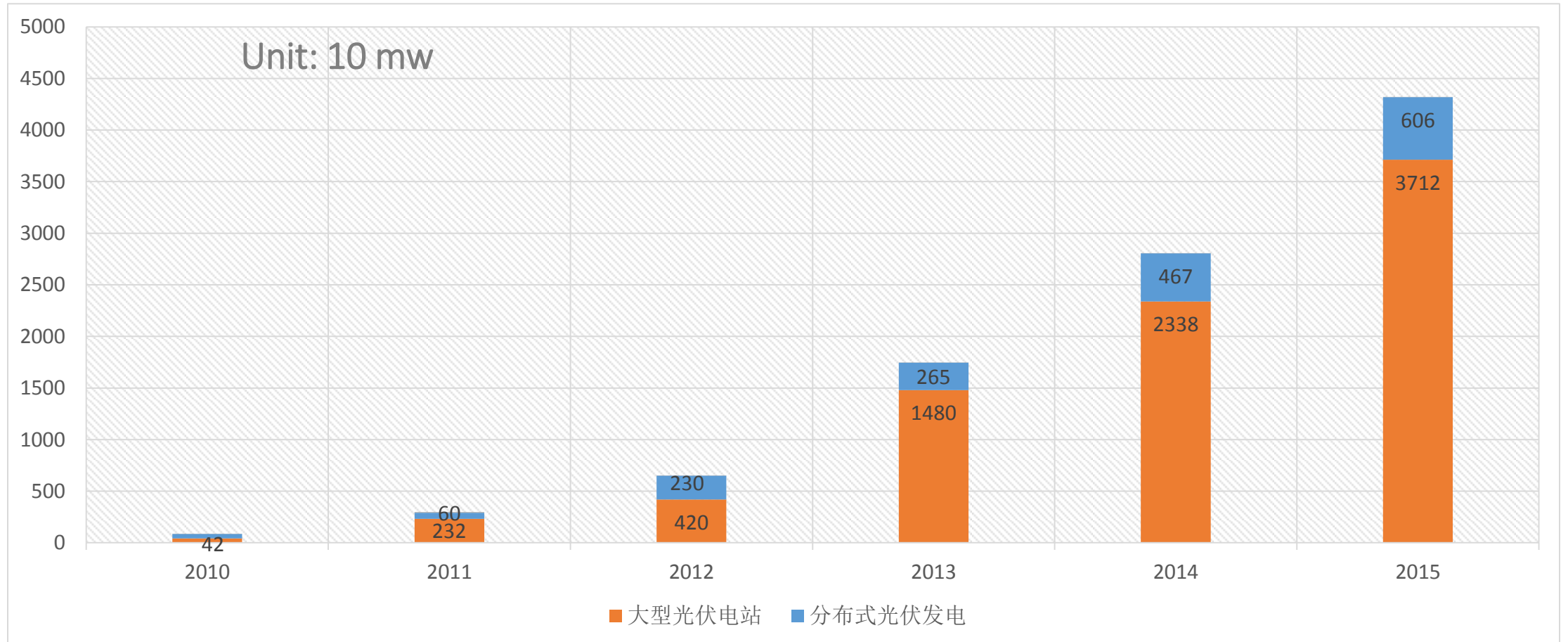
Wind power generation capacity rank the world first ,130Gw commissioned 2015



180 Twh wind power generated in 2015



Solar power generation capacity more than 43Gw, 2015



Biomass generation capacity 10.31 Gw



Low carbon demonstration program

- Selected 6 provinces (Guangdong, Liaoning, Hubei, Shaanxi, Yunnan, Hainan), and 36 cities, including Beijing, Shanghai, Tianjin, Chongqing, and Shenzhen, etc. as demonstration province and city for low carbon development
- Encourage them to peak the carbon emission earlier
- Many cities plan to peak by 2020, or even earlier
- Developed comprehensive action plan of low carbon development for each demonstration provinces and cities
- All demonstration cities achieve better energy and carbon intensity decrease than planned in the last five years

Location of the demonstration sites



Challenges faced

- Low oil price
- Energy consumption growth rate slowed down out of expected (from more 8% to less than 1%)
- Over supply of power generation
- Spare capacity of coal production
- Past high investment in coal and oil sectors
- Higher cost of renewables
- Concerns on nuclear safety, due to Fukushima, and give up policy in German et al

Something necessary

- More comprehensive and clear target of energy development strategy
- System integration and optimization
- Better guidance to energy investment
- Strong policy, if low carbon is real target
- Pay more attention on new demand of energy consumption, especially on tertiary sector, residential use, building and transportation
- Low carbon infrastructure development, especially on urbanization (land use planning, heating and cooling system, building, transport)