The Energy Transition under its INDC Targets in China

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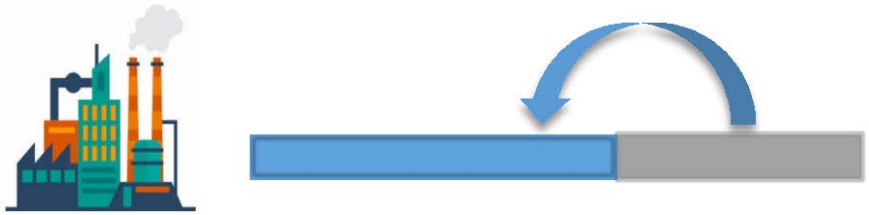
Outline

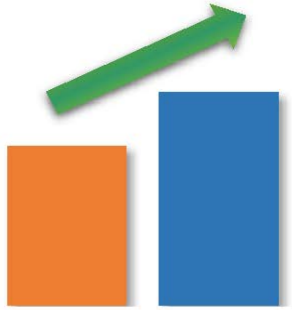
- China’s Targets of INDC
- The Energy Transition and Achievements in China
- The Challenges for Zero Emissions

China : Targets for 2020 on climate change

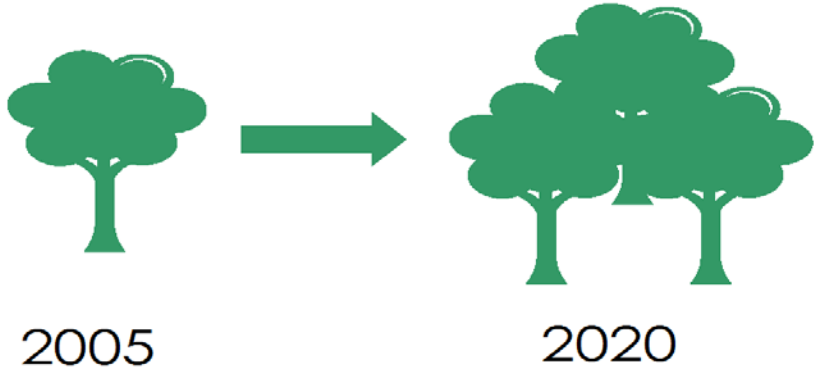


Carbon intensity **Decreased by 40-45%**

Share of non-fossil fuel in primary energy consumption



increase to about 15%



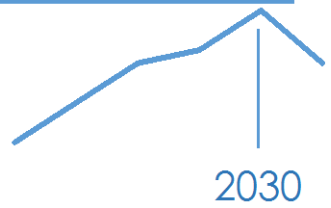
Increase forested area by 40 million ha.

Increase forest stock volume by 1.3 billion m^3

China： targets for 2030 on climate change——INDC

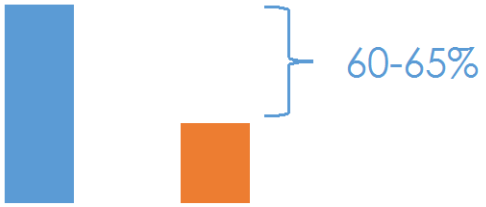
减缓 Mitigation

- **二氧化碳排放**
  CO_2 emission



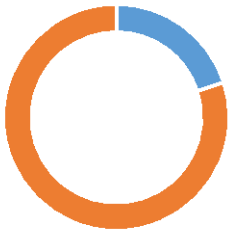
在2030年左右达到峰值
Peak around 2030

- **碳强度**
  Carbon intensity



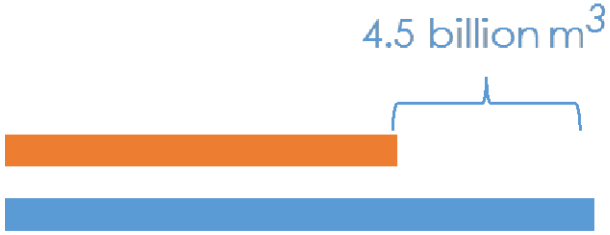
比2005年下降 **60-65%**
Decrease by

- **非化石能源占比**
  Share of non-fossil fuel



提高至 **20%**

- **森林蓄积量**
  Forest stock volume



比2005年增加
45亿立方米

China : Achievements in mitigating climate change (2014)

碳强度
Carbon Intensity

33.8 %
lower than 2005 level

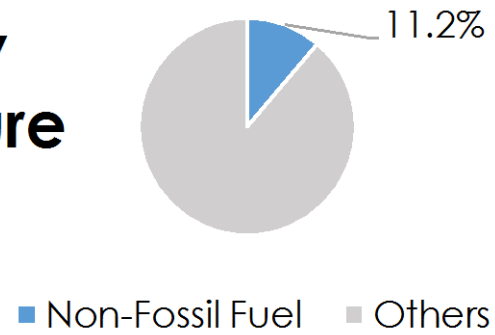
碳汇
Carbon sink

森林面积 **2160** 万公顷 +
Forested area 21.6 million ha.

森林蓄积量 +
21.88 亿立方米
Forest stock volume 2.188 billion m^3

能源结构
Energy Structure

一次能源消费
Primary Energy Consupmtion



300 GW
Hydro Power
水电

95.81 GW
Wind Power
风电

28.05 GW
Solar Power
光伏

19.88 GW
Nuclear Power
核电

China : Achievements in Energy Transition

- By 2014, China for the first time witnessed decrease in coal-fire power generation and coal consumption.
- In 2015, China's output of electric power dropped 2%, meanwhile non-fossil power generation increased 150GWh.
- In 2015, China's renewable energy power generation reached 24.8%, with an increase of 4.8 in 3 years.

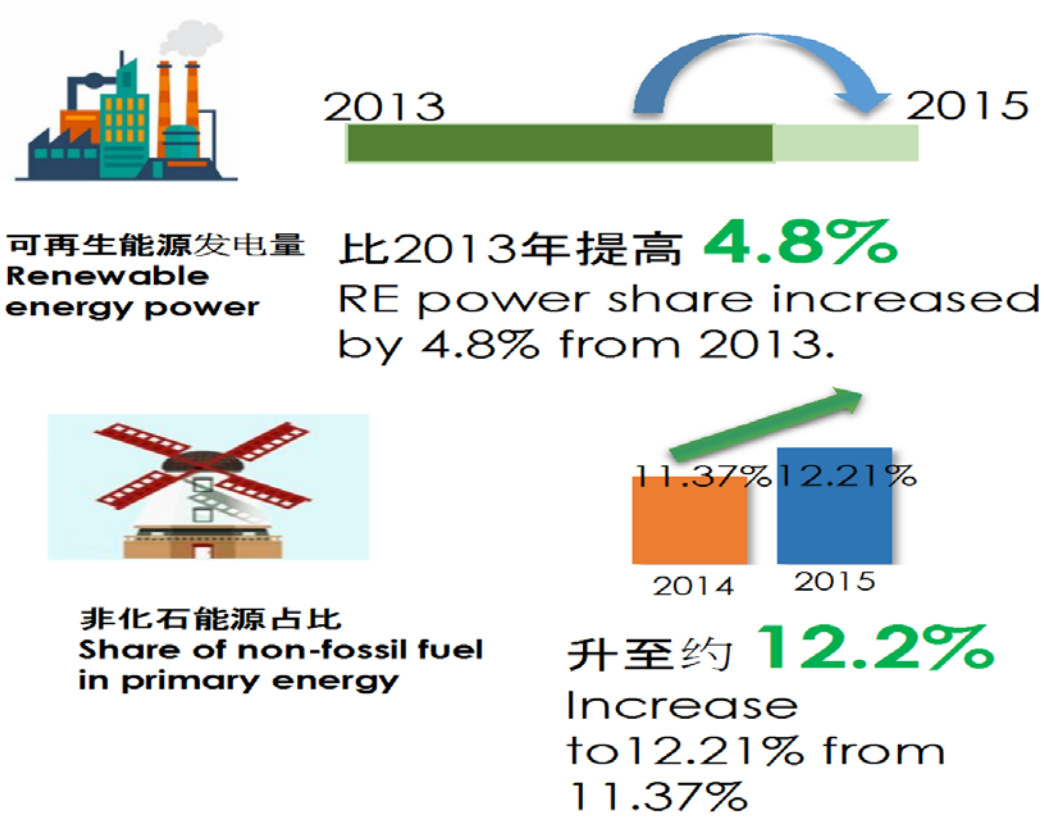
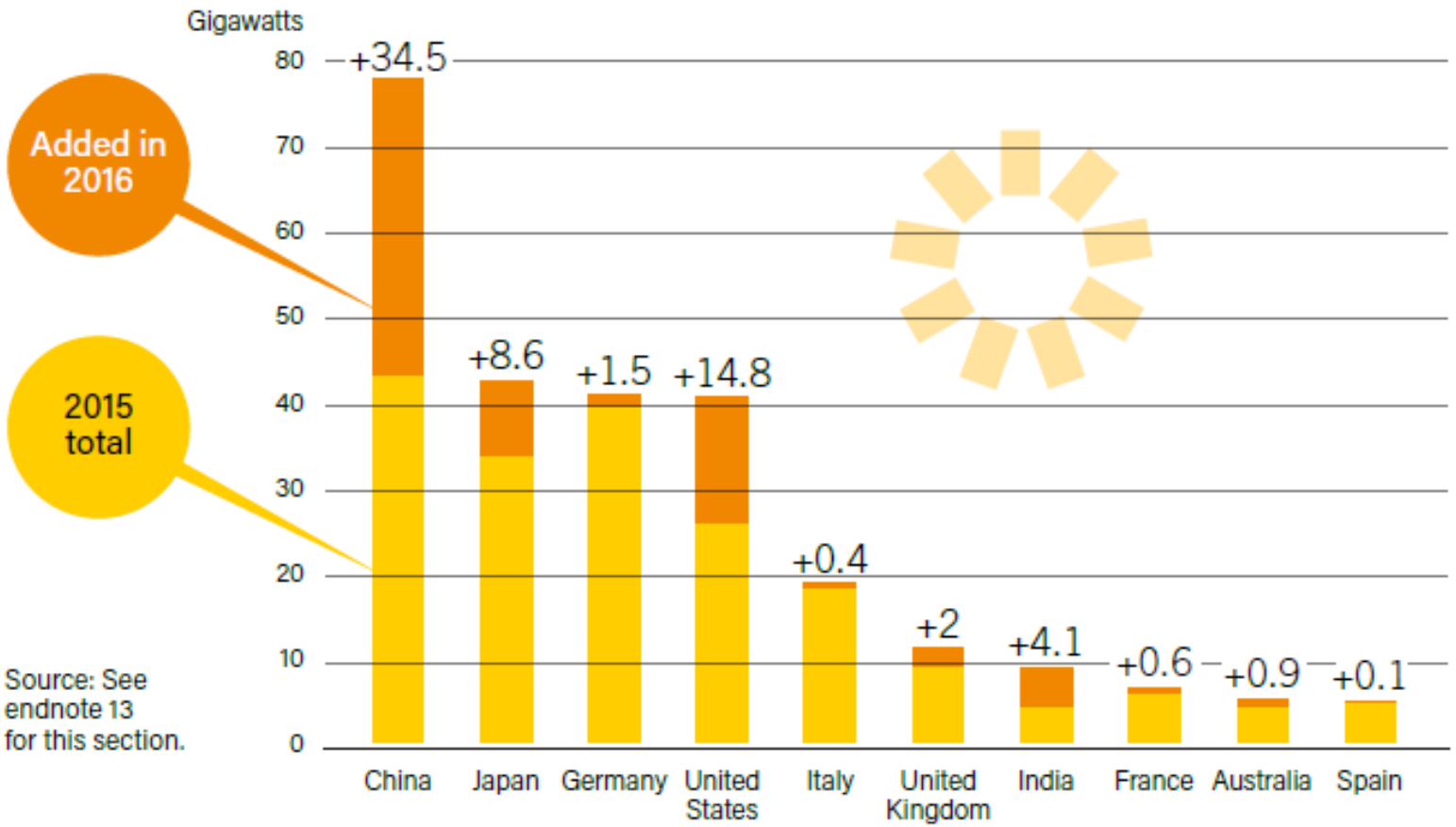


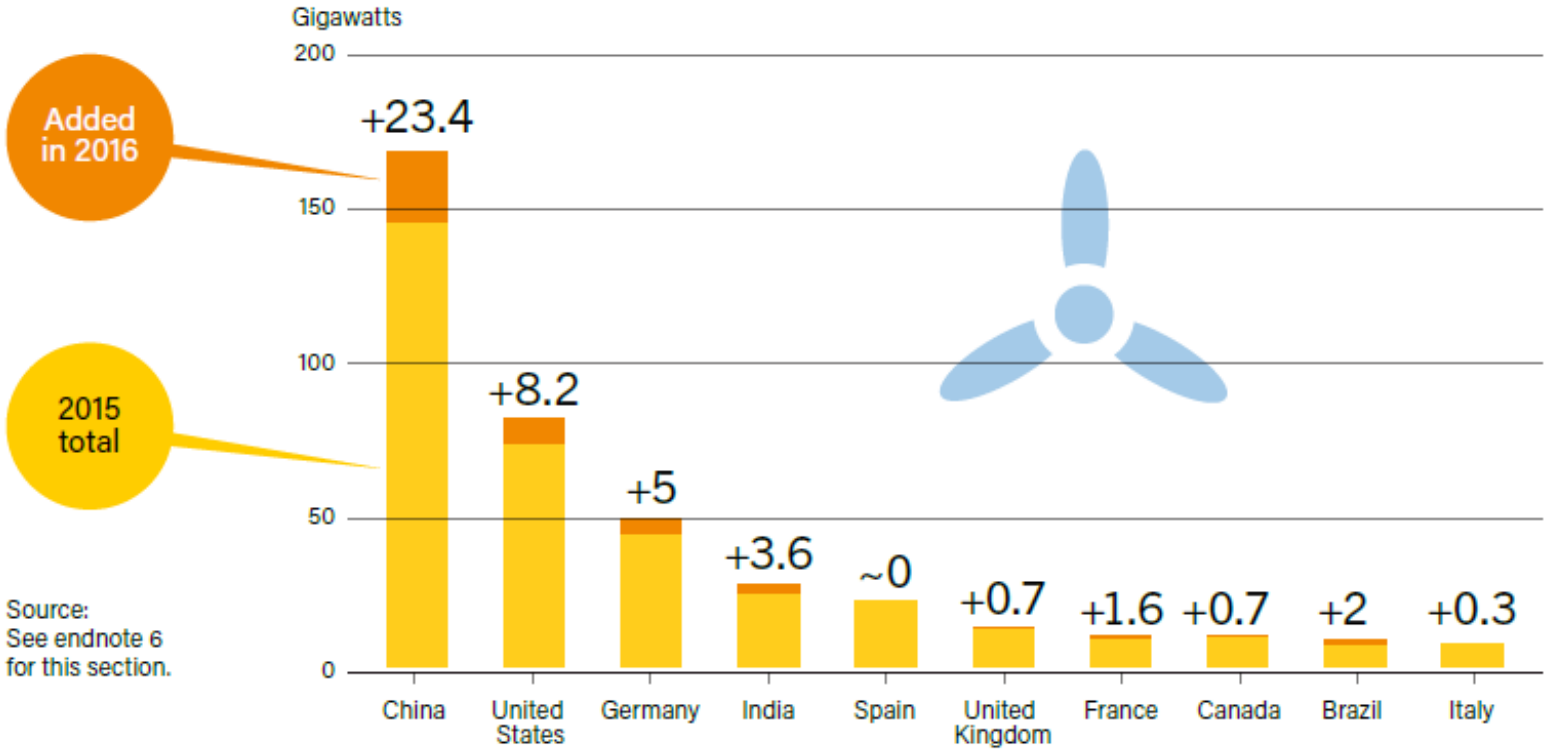
Figure 17. Solar PV Capacity and Additions, Top 10 Countries, 2016



Source: See endnote 13 for this section.

CHINA ACCOUNTED FOR **46%** OF NEW CAPACITY.

Figure 27. Wind Power Capacity and Additions, Top 10 Countries, 2016

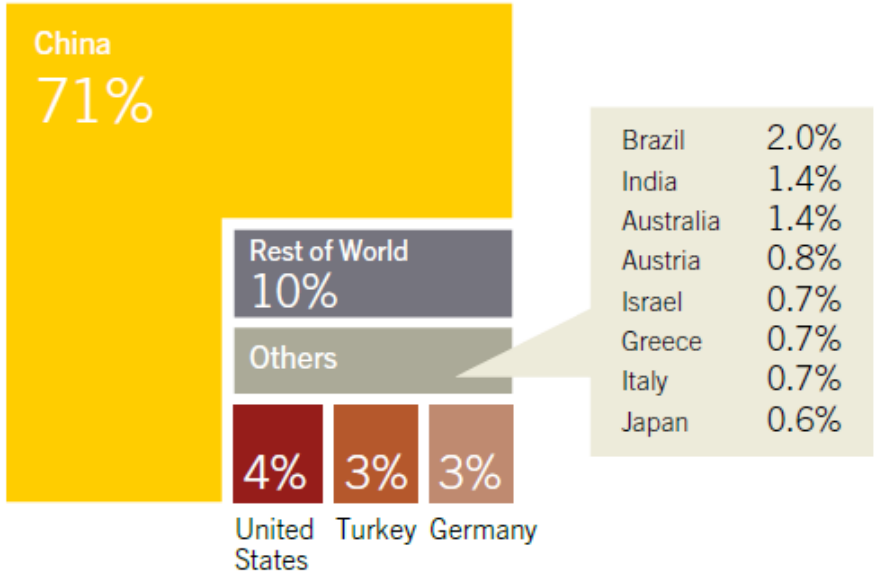


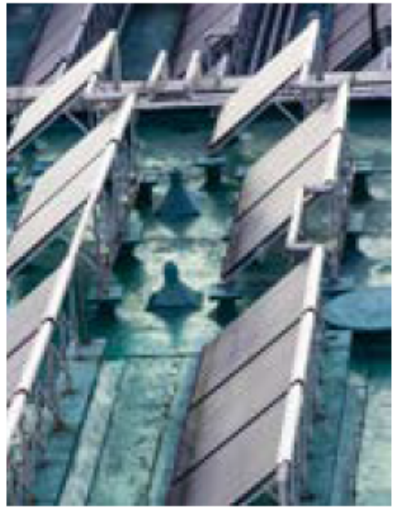
Source:
See endnote 6
for this section.

Note: Germany's additions are net of decommissioning and repowering. "~0" denotes capacity additions of less than 50 MW.

Solar district heating capacity **DOUBLED** in Denmark (in 2016).

Figure 23. Solar Water Heating Collectors Global Capacity in Operation, Shares of Top 12 Countries and Rest of World, 2015





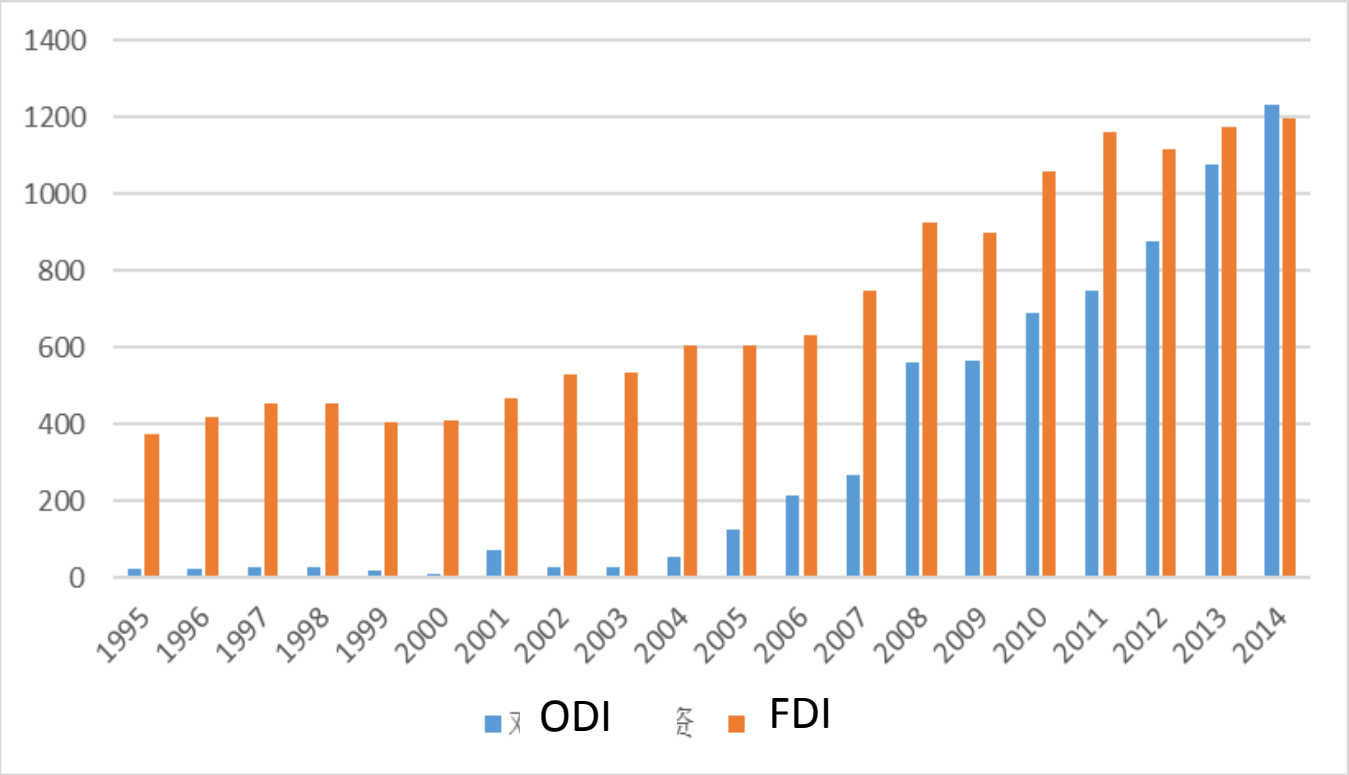
Note: Total does not add up to 100% due to rounding.

Source: IEA SHC. See endnote 3 for this section.

	1	2	3	4	5
POWER					
Renewable power (incl. hydro)	**China**	United States	Brazil	Germany	Canada
Renewable power (not incl. hydro)	**China**	United States	Germany	Japan	India
Renewable power capacity *per capita* (among top 20, not including hydro[3])	**Denmark**	Germany	Sweden	Spain	Portugal
Biopower generation	**United States**	China	Germany	Brazil	Japan
Geothermal power capacity	**United States**	Philippines	Indonesia	Mexico	New Zealand
Hydropower capacity[4]	**China**	Brazil	United States	Canada	Russian Federat.
Hydropower generation[4]	**China**	Brazil	Canada	United States	Russian Federat.
CSP	**Spain**	United States	India	Morocco	South Africa
Solar PV capacity	**China**	Germany	Japan	United States	Italy
Solar PV capacity *per capita*	**Germany**	Italy	Belgium	Japan	Greece
Wind power capacity	**China**	United States	Germany	India	Spain
Wind power capacity *per capita*	**Denmark**	Sweden	Germany	Ireland	Spain
HEAT					
Solar water heating collector capacity[5]	**China**	United States	Germany	Turkey	Brazil
Solar water heating collector capacity *per capita*[5]	**Austria**	Cyprus	Israel	Barbados	Greece
Geothermal heat capacity[6]	**China**	Turkey	Japan	Iceland	India
Geothermal heat capacity *per capita*[6]	**Iceland**	New Zealand	Hungary	Turkey	Japan

NASA images show stunning progress of China's vast 850 MW Longyangxia Solar Park

2013 **2017**

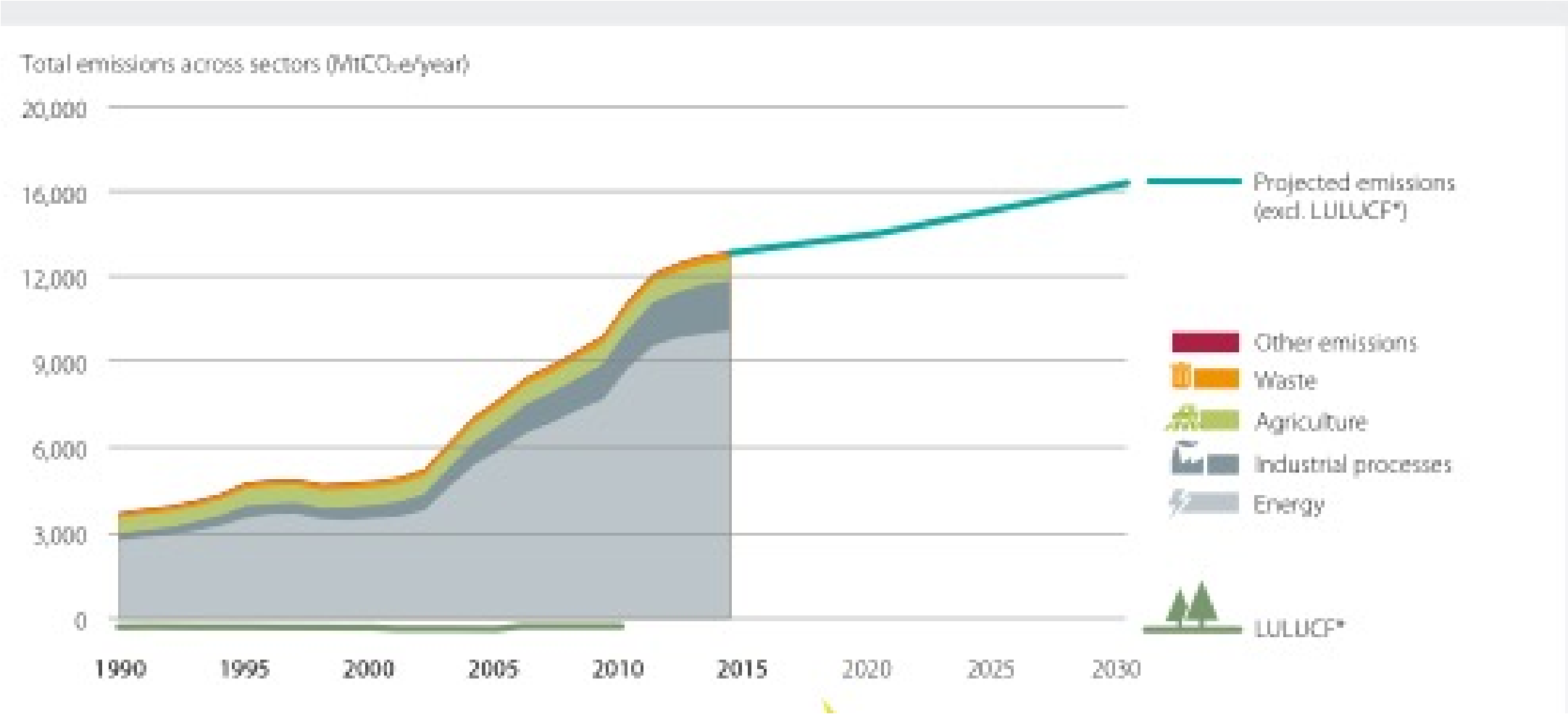


China's FDI and ODI，1995-2014，US$100million

Clean Fossil energy policy in China

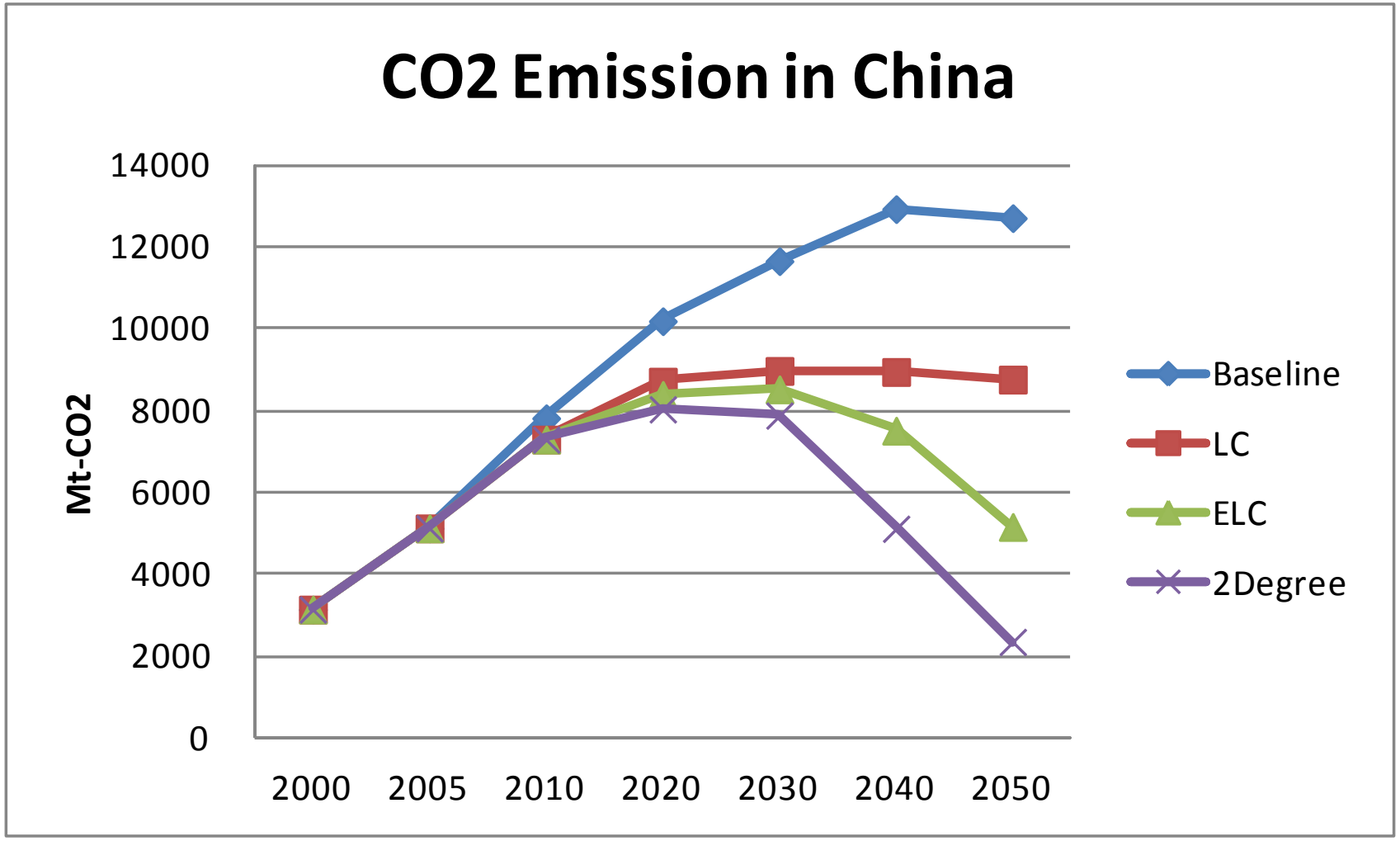
- **To decease the consumption of coal.**
  - The coal consumption : decreasing the share of coal from 64% in 2015 to 58% in 2020, 4.4bn tonnes.
  - “Interim measures of the replacement coal consumption in key areas”
- **To increase the natural gas consumption**
  - The natural gas consumption: increasing from 5.9% in 2015 to 10% in 2020.
  - Build the practical and reasonable system of gas-electricity price linkage
  - The key project of “Coal changed to Gas” should be promoted fast in the main “2+26” cities.
- **To develop cleaner production and high-efficient application of coal**
  - Cleaning raw coal will increase from 66% in 2015 to 75% in 2020
  - Comprehensive used coal gangue will up to 75% in 2020.
  - The ultra-low emissions in coal-fired power plants

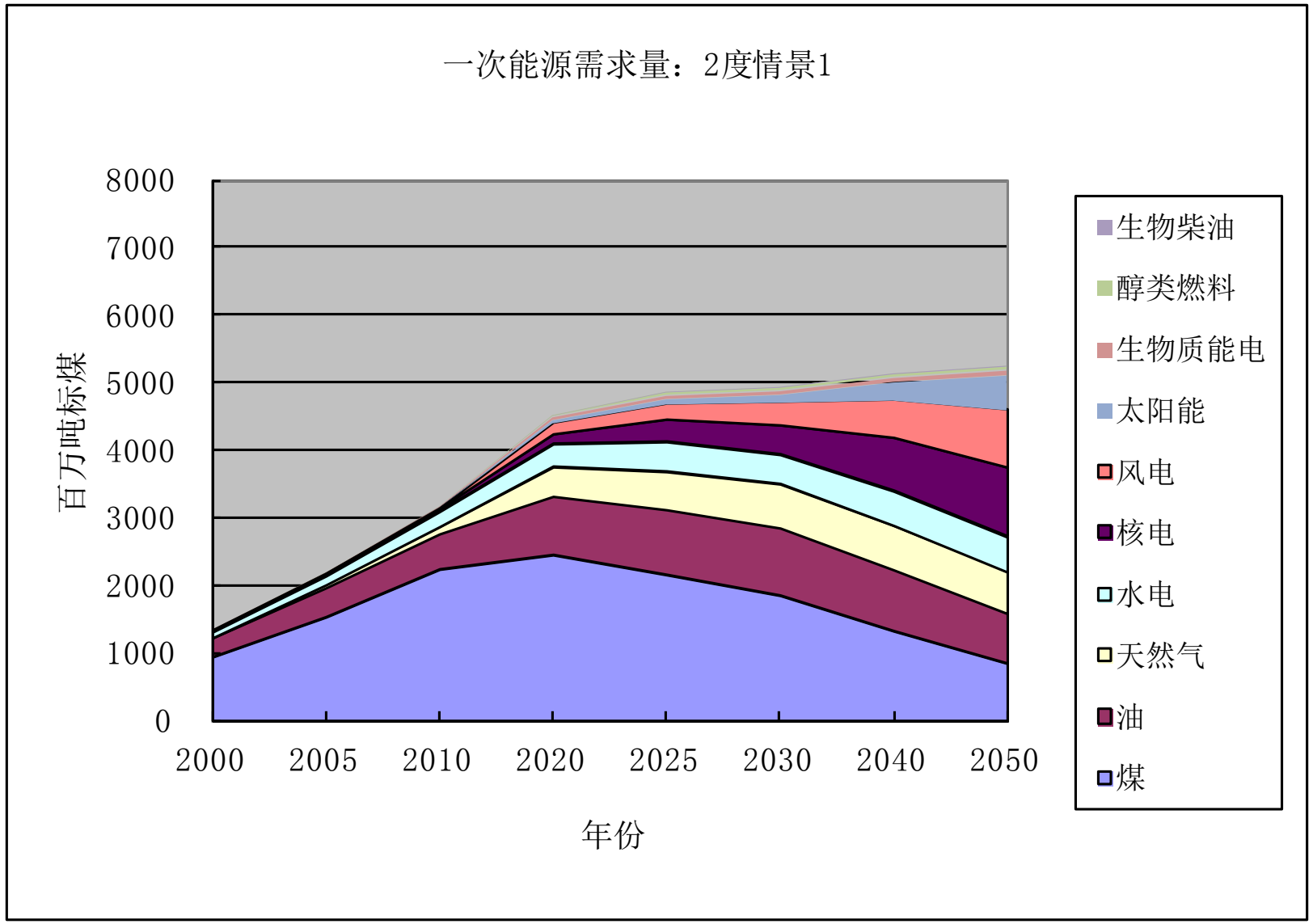
Challenges : Low- carbon and Zero Emission

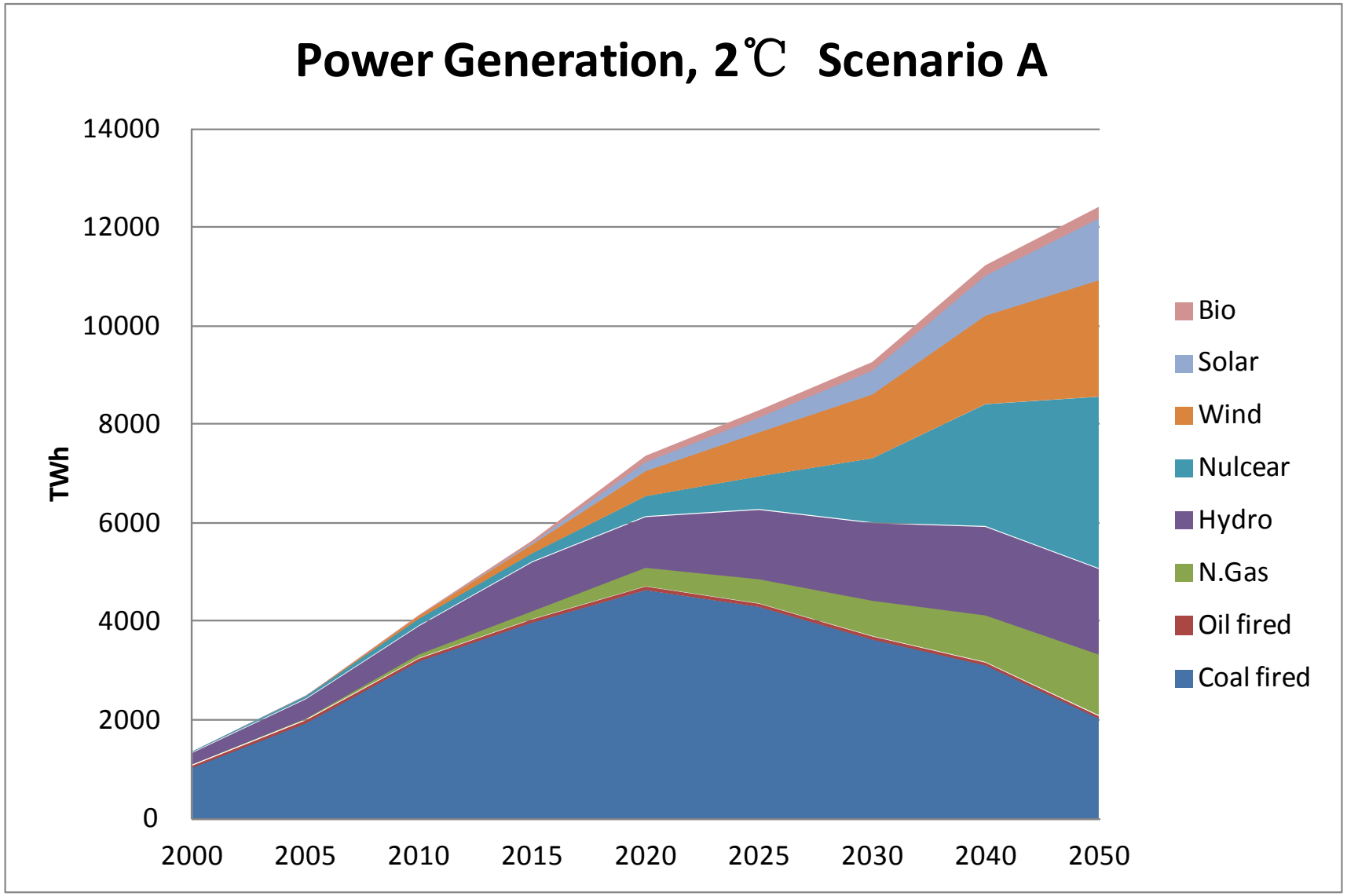


Challenges : Low- carbon and Zero Emission

Transformation: CO_2 emission, a rapid change

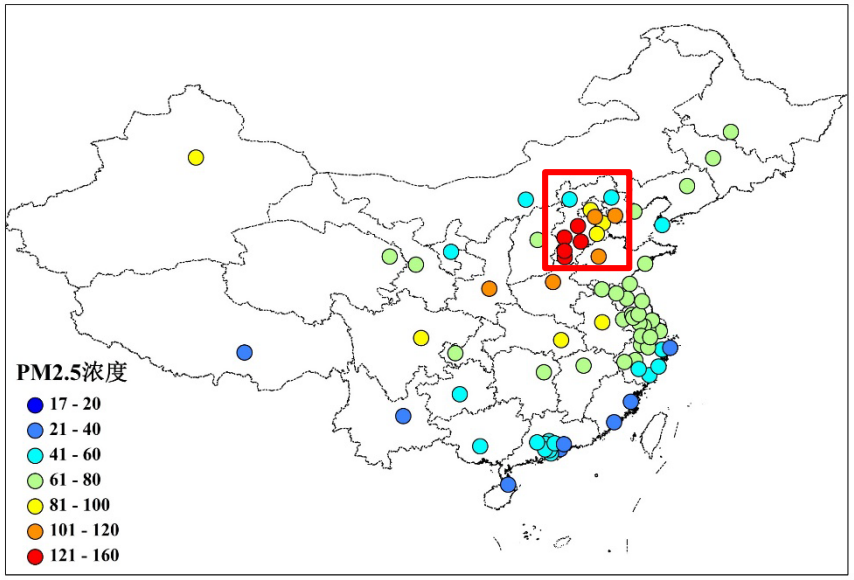



一次能源需求量：2度情景1
8000
7000
6000
5000
4000
3000
2000
1000
0
百万吨标煤
2000
2005
2010
2020
2025
2030
2040
2050
年份
生物柴油
醇类燃料
生物质能电
太阳能
风电
核电
水电
天然气
油
煤

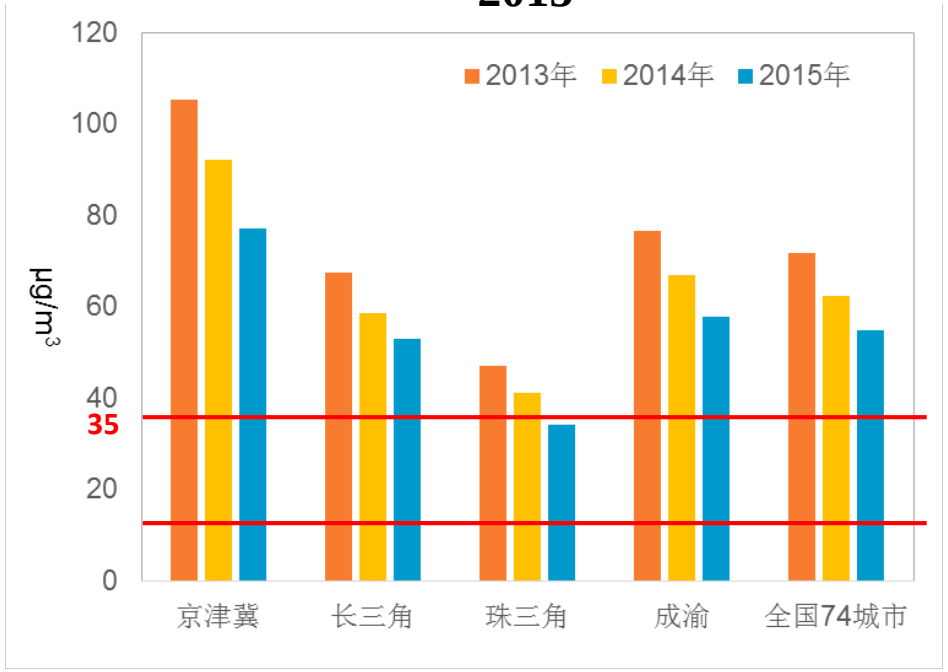

Power Generation, 2℃ Scenario A
TWh
14000
12000
10000
8000
6000
4000
2000
0
2000
2005
2010
2015
2020
2025
2030
2040
2050
Bio
Solar
Wind
Nulcear
Hydro
N.Gas
Oil fired
Coal fired

Air pollution is a serious issue

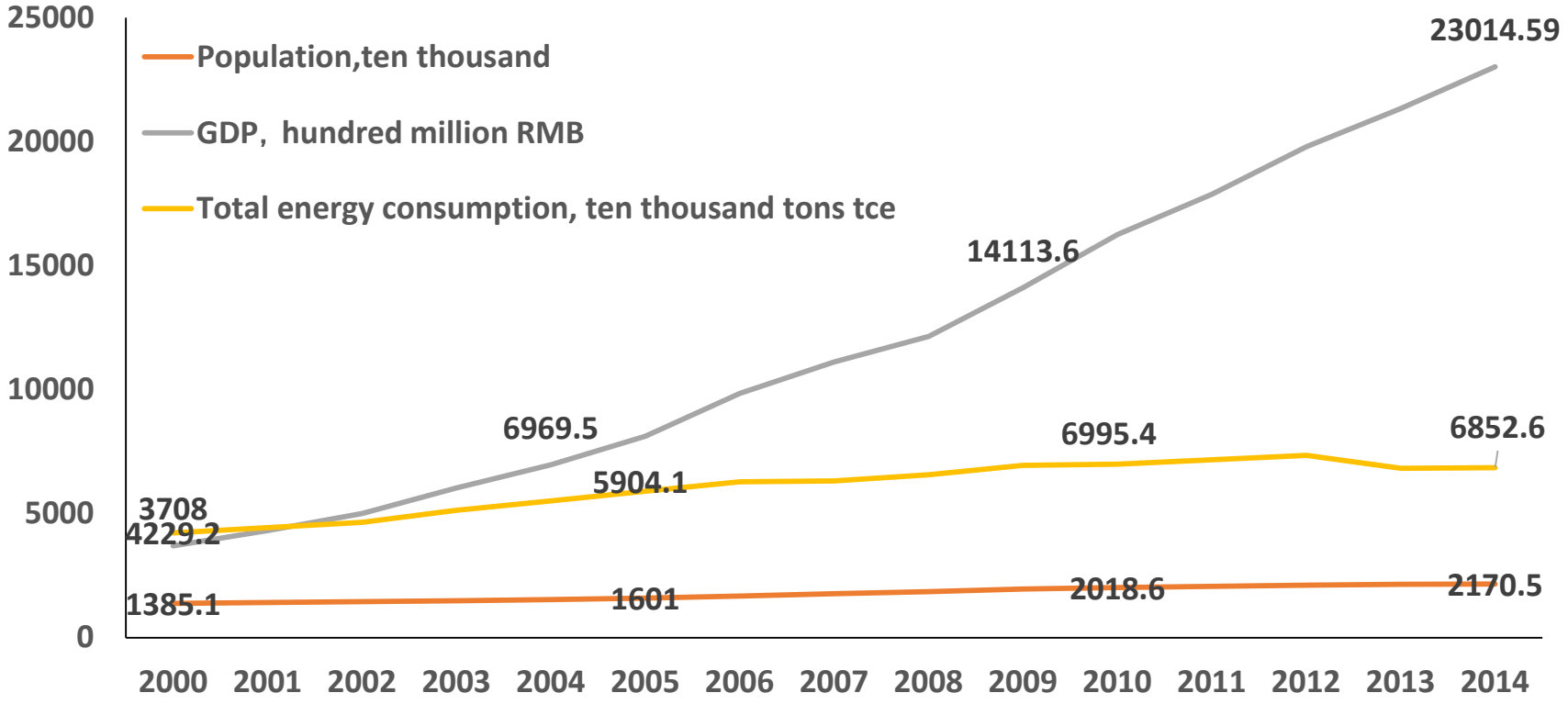
PM2.5 concentration of 74 cities in 2013



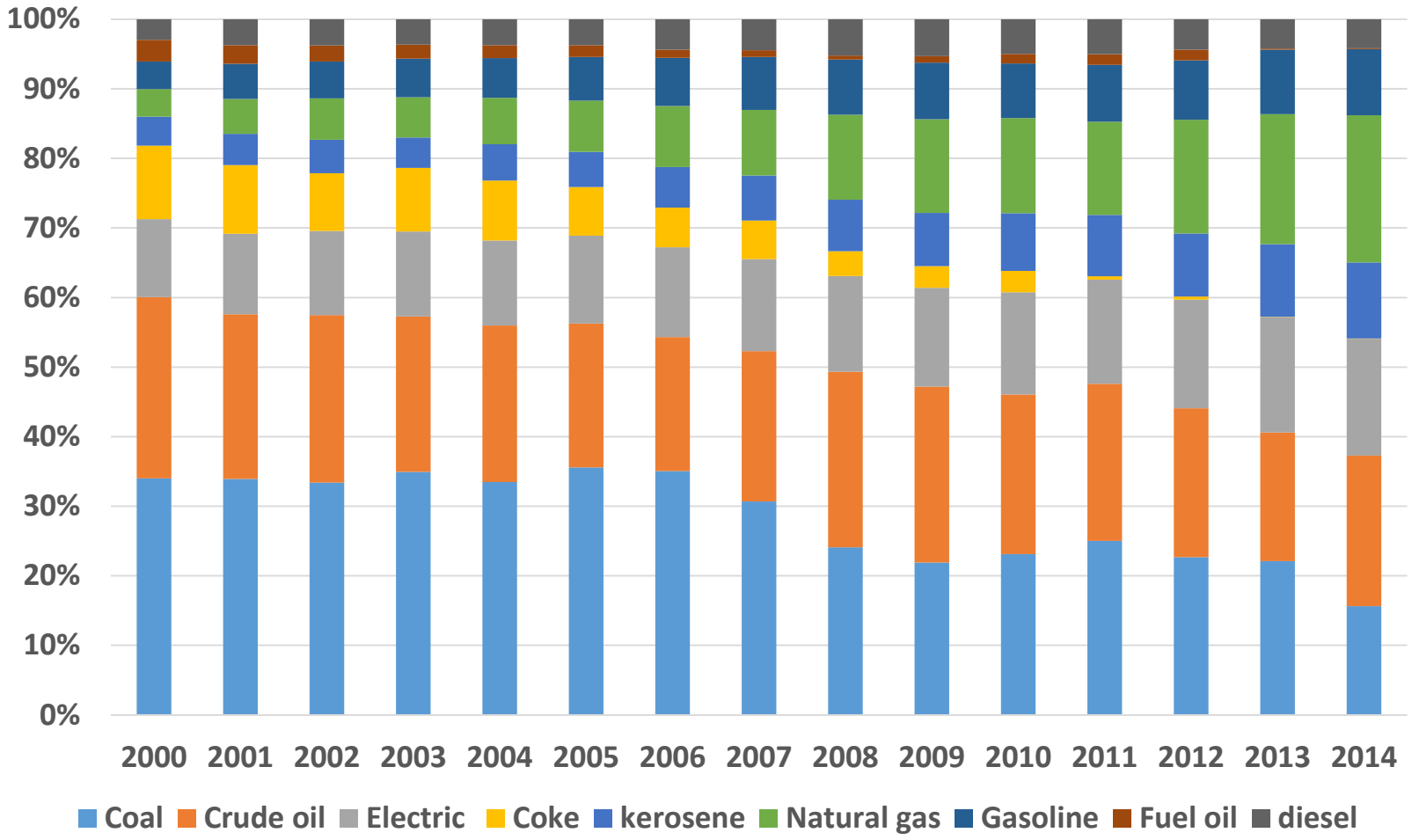
PM2.5 annual concentration from 2013-2015



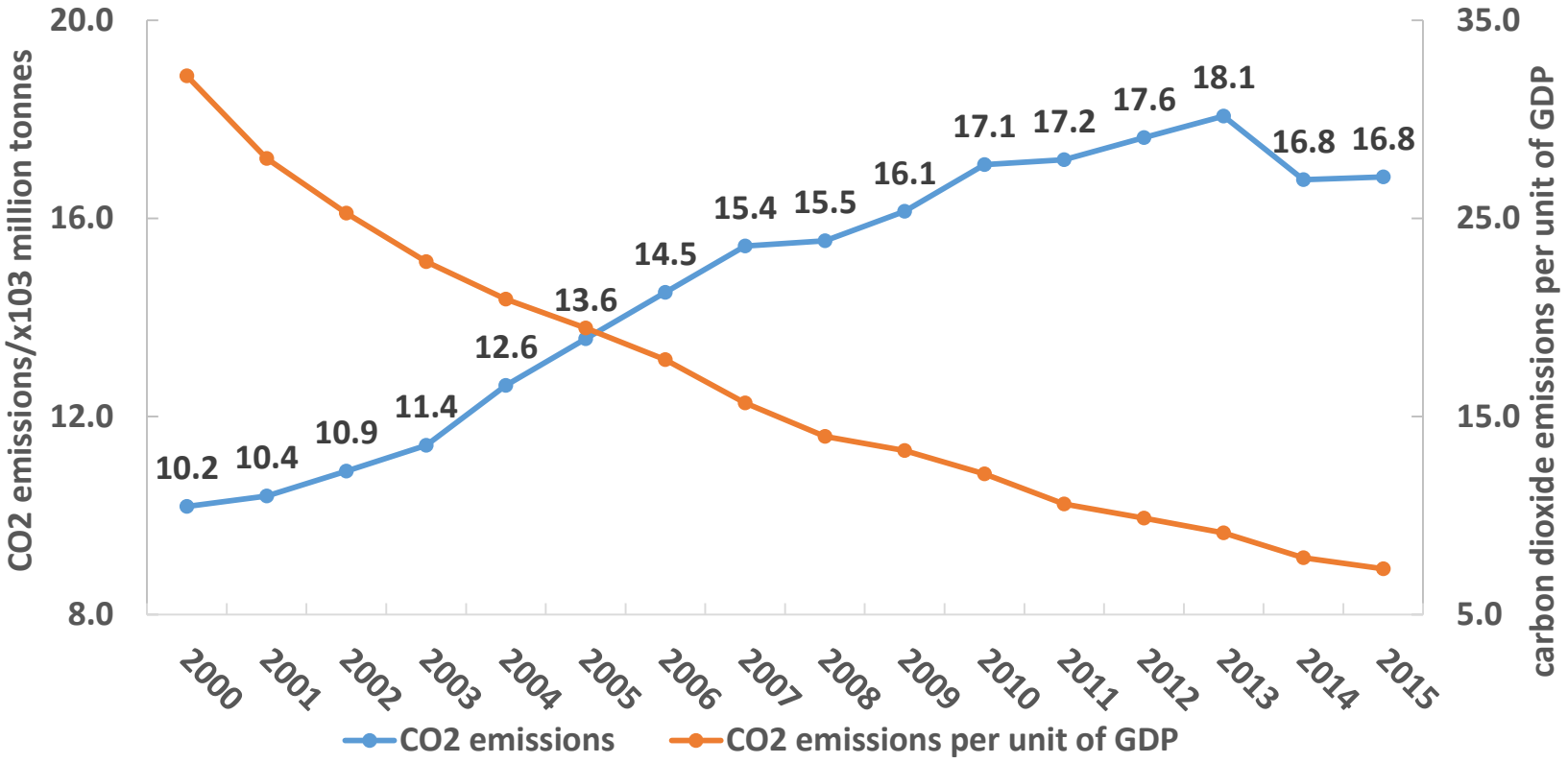
If to meet the WHO recommended standard, Emissions from energy activities will be 0



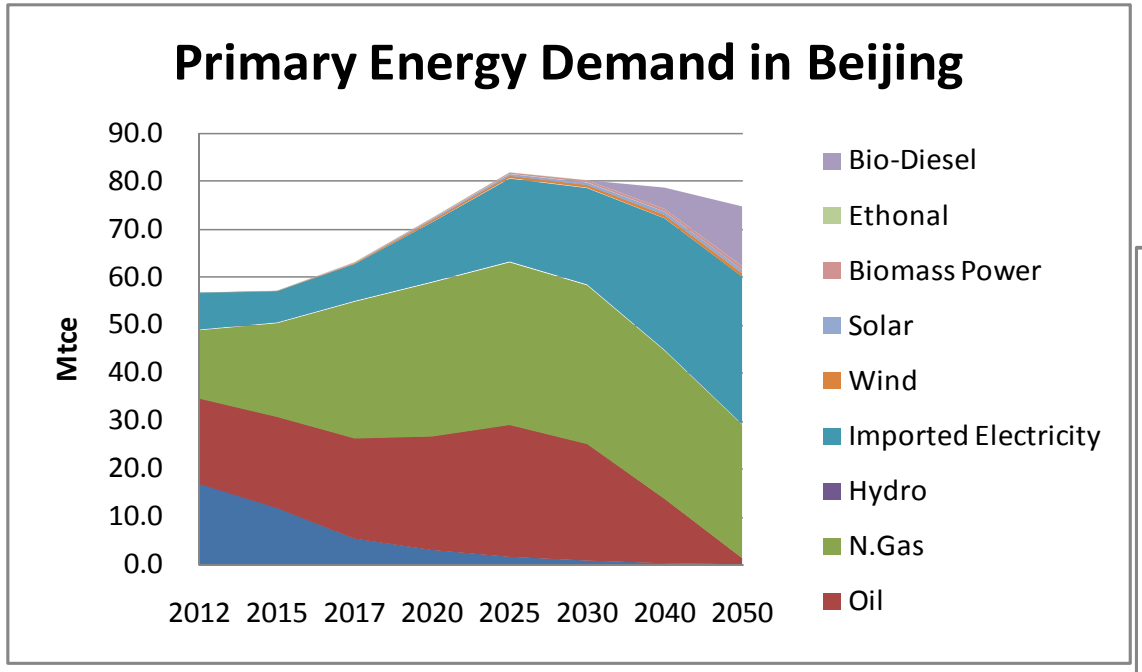
Trends in energy consumption, population and GDP in Beijing in 2000-2014

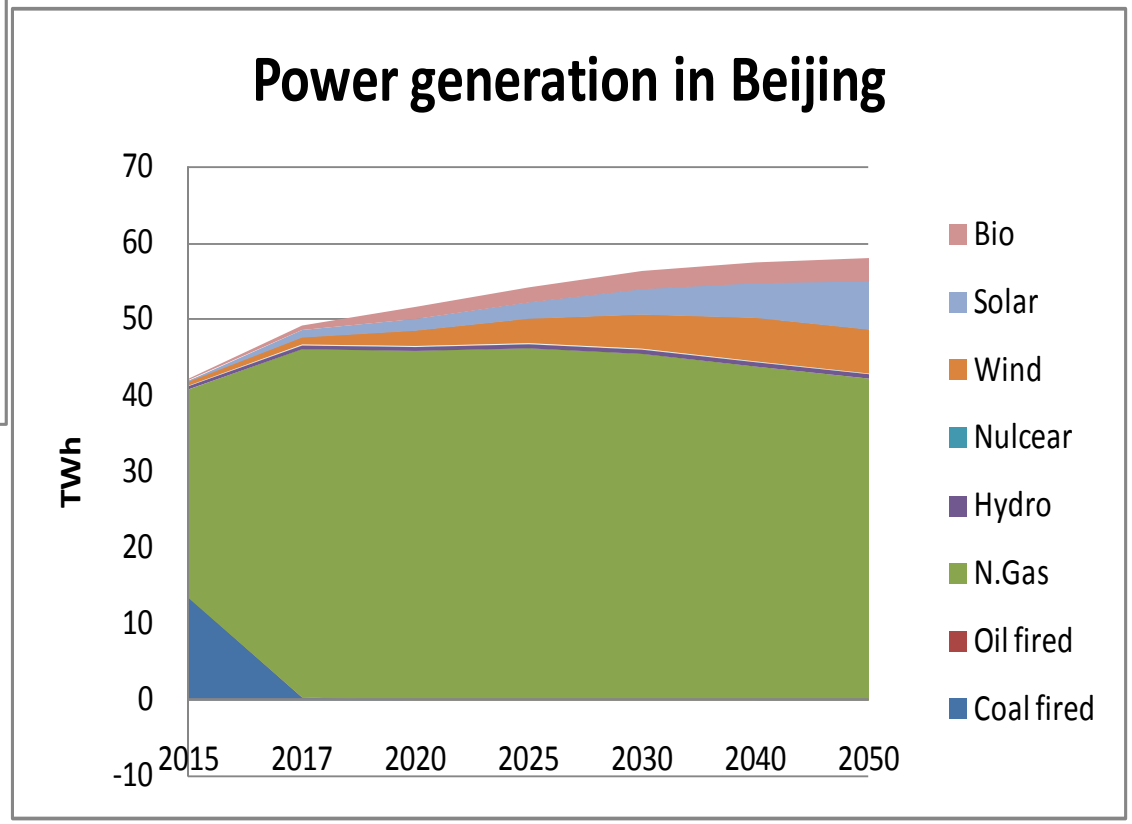


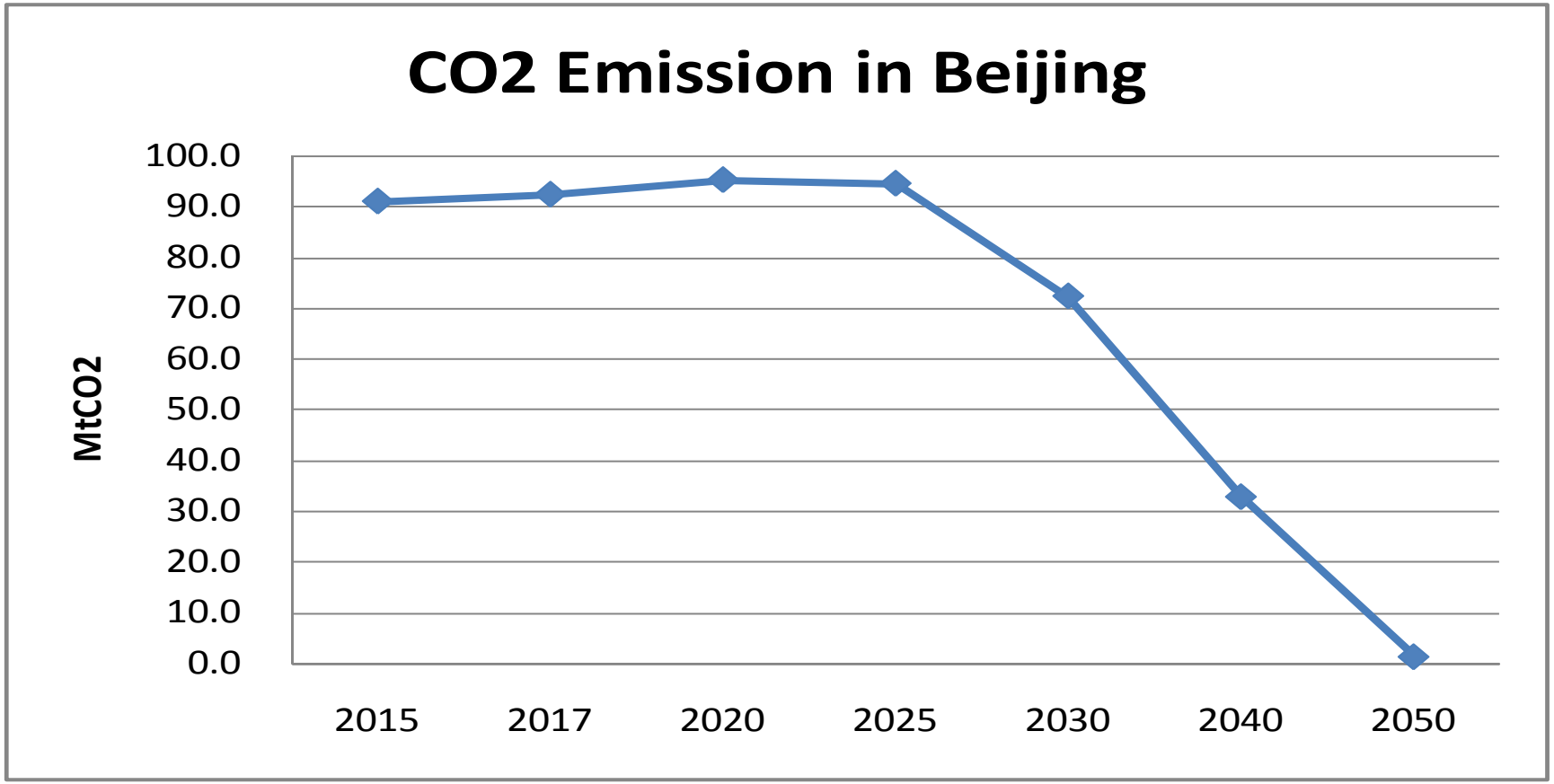
Energy Consumption Structure in Beijing in 2000-2014



CO_2 emissions and Carbon Intensity in 2000-2015 in Beijing


Primary Energy Demand in Beijing
Mtce
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
2012
2015
2017
2020
2025
2030
2040
2050
Bio-Diesel
Ethonal
Biomass Power
Solar
Wind
Imported Electricity
Hydro
N.Gas
Oil


Power generation in Beijing
TWh
70
60
50
40
30
20
10
0
-10
2015
2017
2020
2025
2030
2040
2050
Bio
Solar
Wind
Nulcear
Hydro
N.Gas
Oil fired
Coal fired


CO2 Emission in Beijing
MtCO2
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
2015
2017
2020
2025
2030
2040
2050

Thank You For Your Attention !

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