



中国科学院
CHINESE ACADEMY OF SCIENCES

The Trend of China's Nation-Wide Emission Reduction Policy in the Next 5 Years

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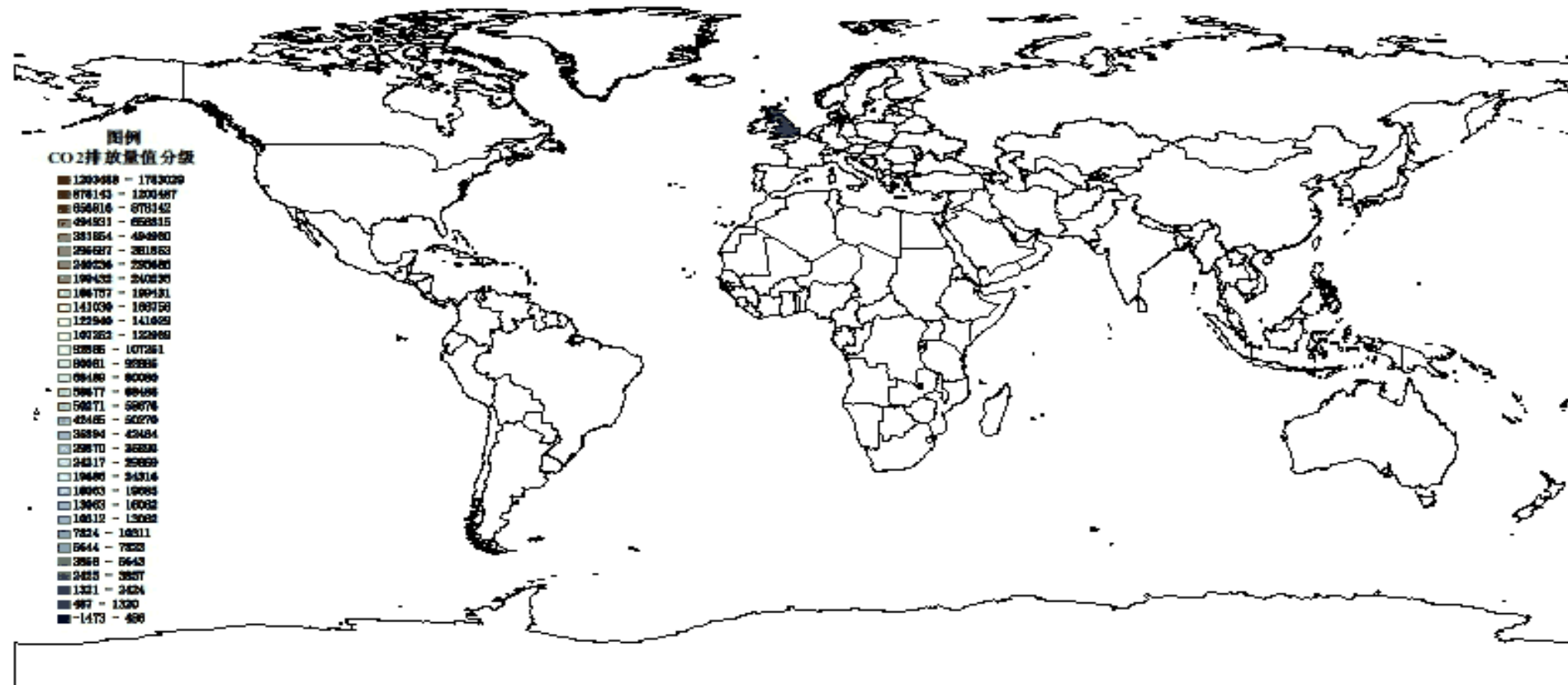
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The Regional Differences of the Global Carbon Emissions

工业化革命以来全球温室提起排放态势

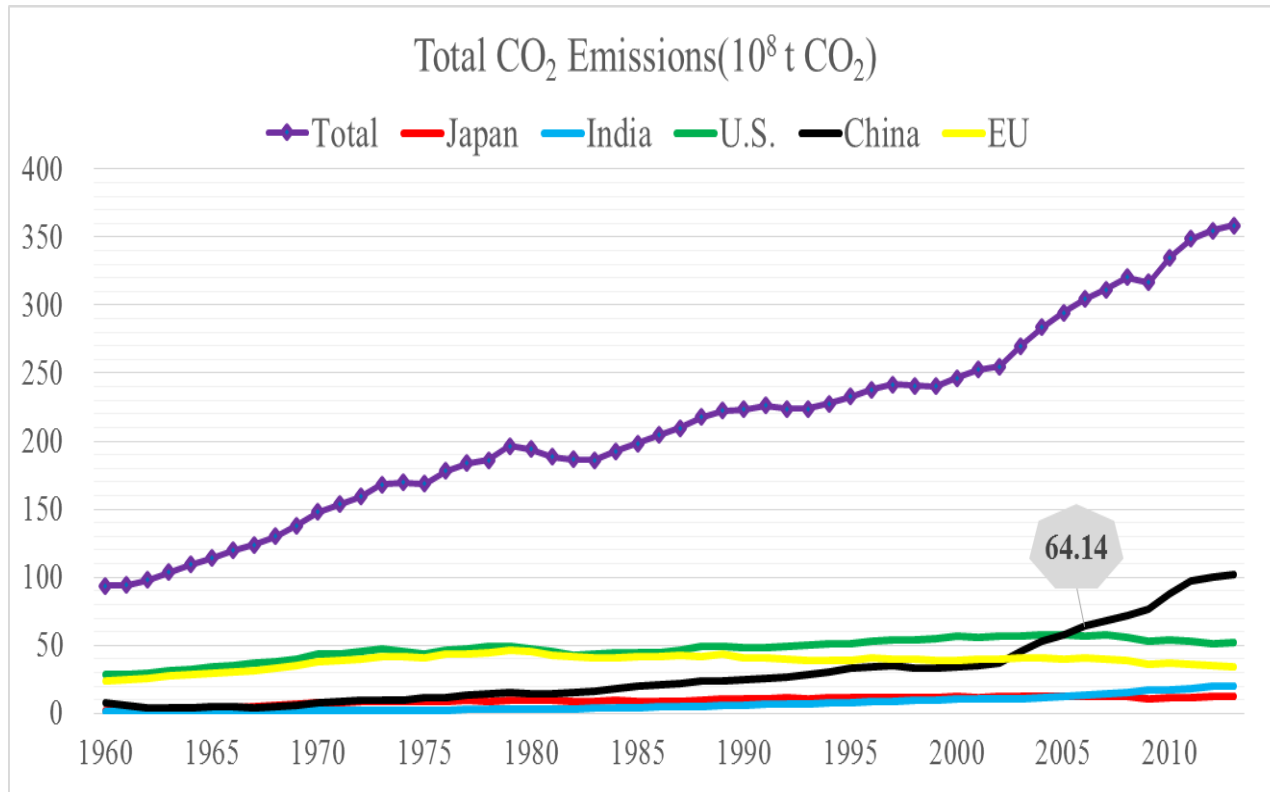
—— 1751年



Carbon emission was linked with the Population Increasing and Industrialization from 1751

(Source: Qu et al., 2011.)

The Trend of the World CO₂ Emissions



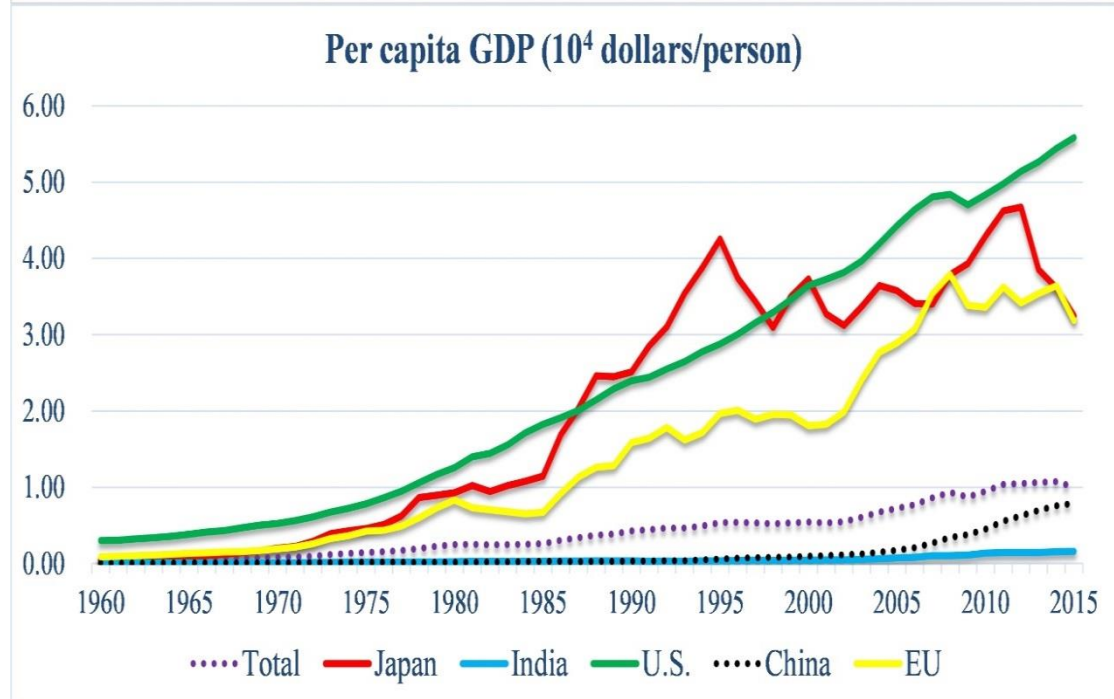
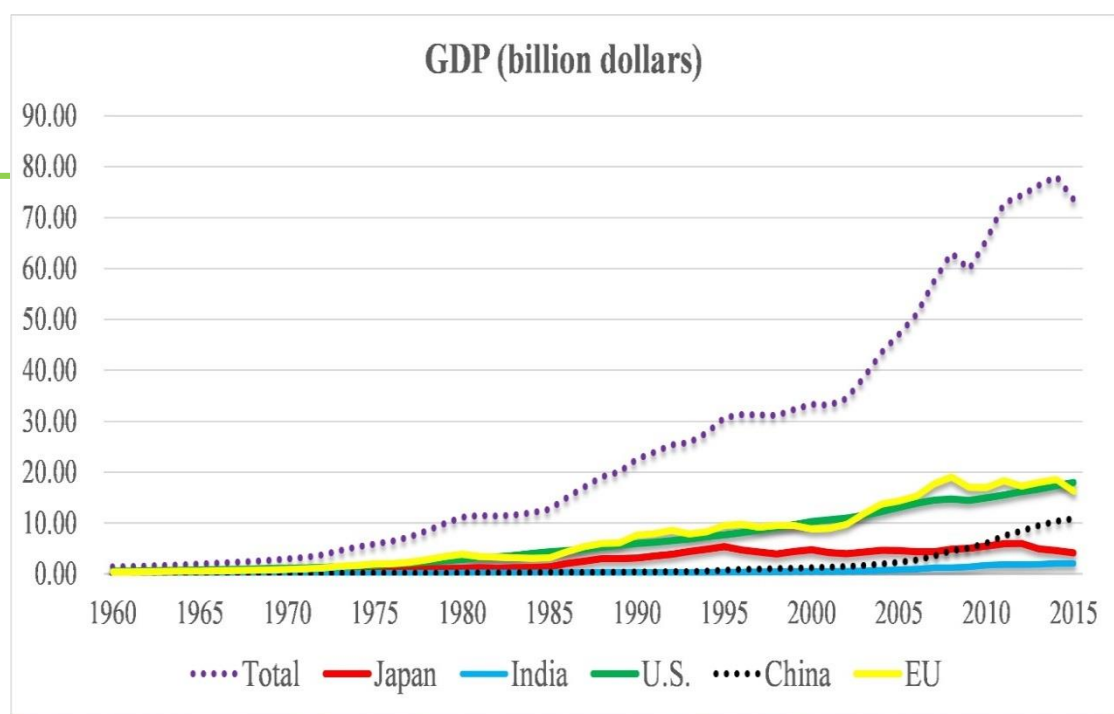
World's total CO₂ emissions raised from 93.86×10^8 t CO₂ to 358.49×10^8 t CO₂ from 1960 to 2015, which increased 2.82 times, with an annual growth rate of 2.59%.

China's total CO₂ emissions raised from 7.81×10^8 t CO₂ to 102.49×10^8 t CO₂ from 1960 to 2015, which increased 1.05 times, with an annual growth rate of 5.44%.

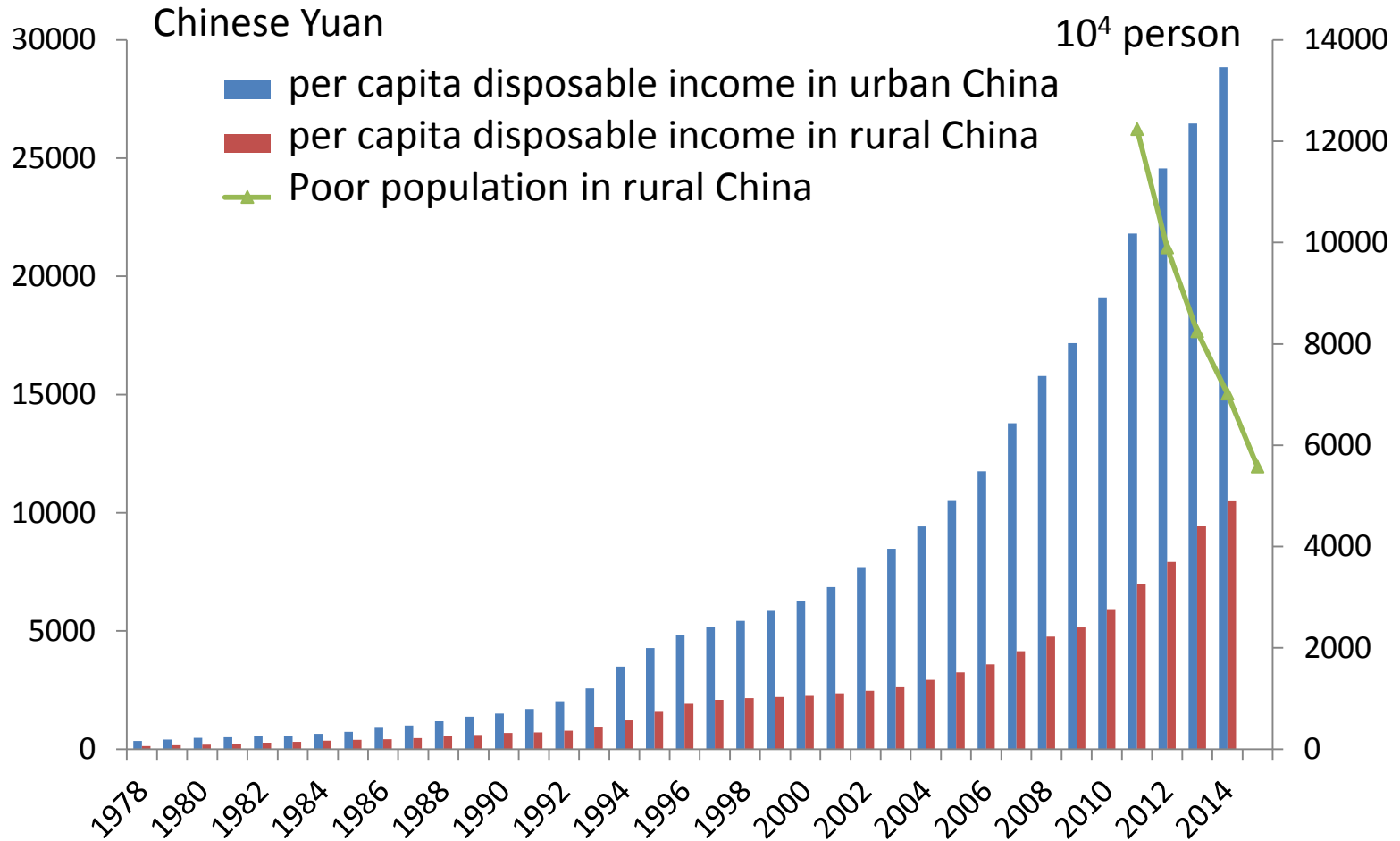
2006, China's total CO₂ emissions surpassed U.S.'s, which became the most emitter in the world.

World GDP

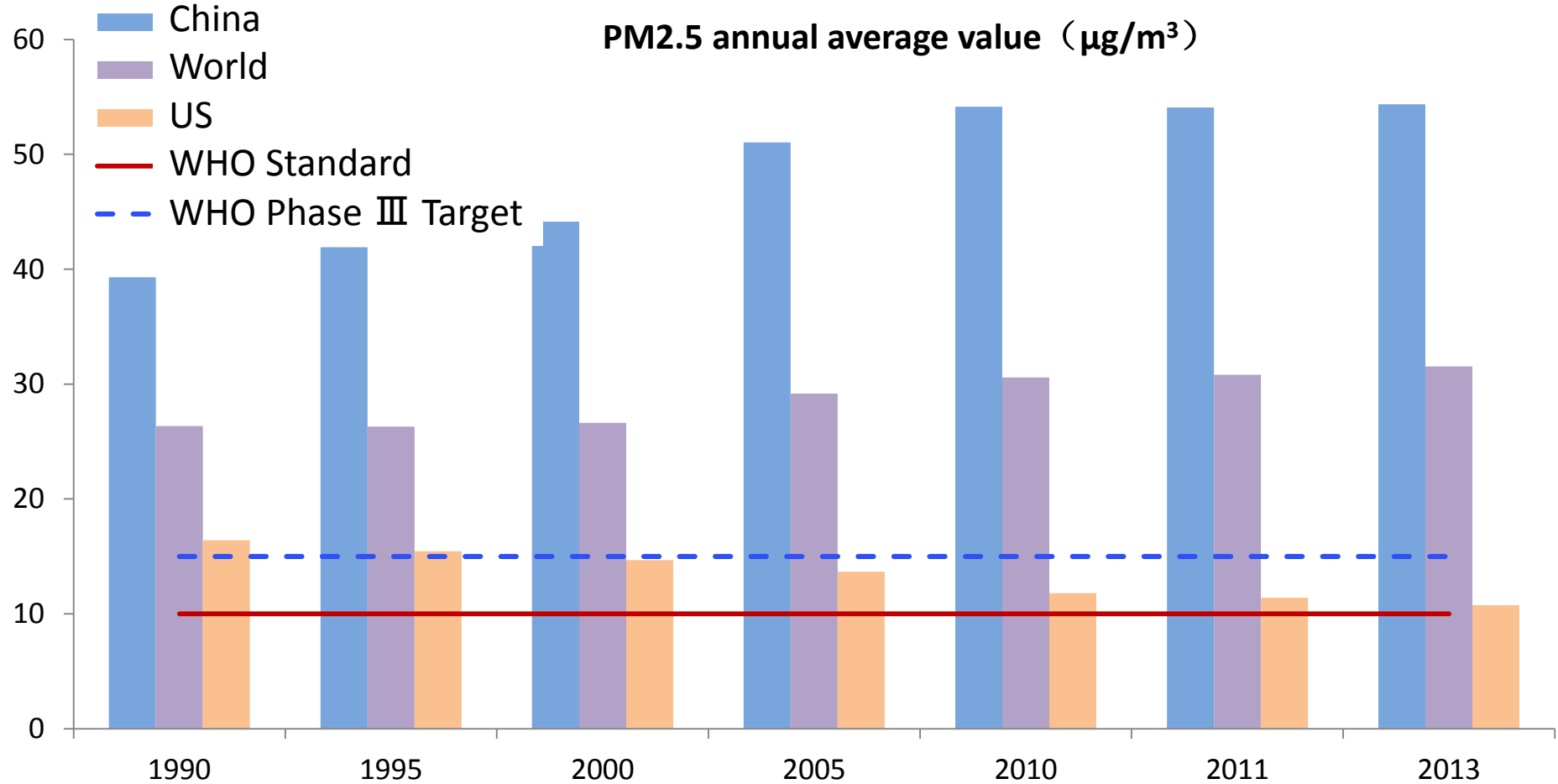
In 2009, China's total GDP surpass Japan's. While, per capita GDP of China is lower than world's average level, and are more less than U.S.'s. In 2015, per capita GDP in China is just 14.19% accounting to U.S.'s per capita GDP.



Population and Development in China



Development and Environment in China



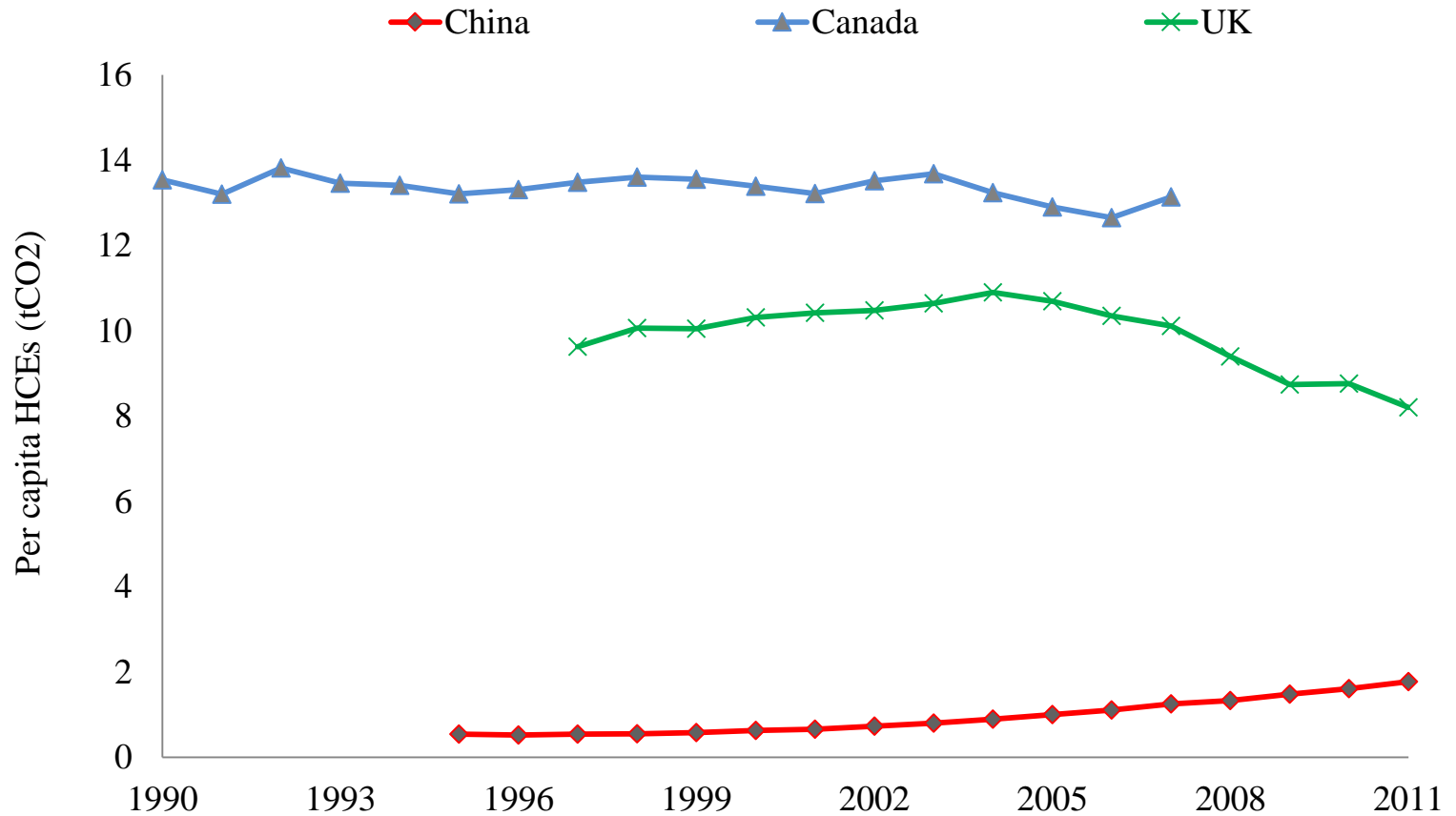
The regional differences of the HCEs in different nations

Comparison of China, Canada and the UK's per household HCEs (tCO₂) with other countries

Sources	China	Canada	UK	Netherlands	Sweden	Norway	US	Philippines	Australia
Our research (from 2005 data)	3.14	33.93	25.24						
Kerkhof et al., 2008 (Based on hybrid approach of process analysis and input–output analysis; Netherland, 2000; UK, 1998; Sweden, 2002; & Norway, 1997 data)			20.2	18.96	12.2	13.6			
Büchs and Schnepf, 2013 (Based on expenditure survey, sample size of 24,446 households in year 2008/09)			20.2						
Druckman and Jackson, 2009 (based on a quasi-multi-regional input–output (QMRIO) model, based on 2004 data)			24						
Statistics Sweden, 2003 (based on input–output analysis, used year 2000 data)					10				
Peters and Hertwich, 2006 (based on input output analysis, used year 2000 data)						13.5			
Weber, 2008; Weber & Matthew, 2008 (Based on consumer expenditure survey of 17,250 households in 2004). This is lifecycle analysis.							40		
Weber, 2008; Weber & Matthew, 2008 (Based on input-output analysis, used 2004 data). This is lifecycle analysis.							57		
Jones & Kammen, 2011 (based on 2000 household survey in 2005). This is lifecycle analysis.							48		
Seriño, 2014 (based on input output analysis, data from 2006)								1.84	
EPA Victoria, 2013									18
Average of reported HCEs (without considering dates)	3.14	33.93	22.41	18.96	11.1	13.6	48.3	1.84	18

(Source: Tek Narayan Maraseni, Jiansheng Qu, Jingjing Zeng, 2015.)

Per capita HCEs of China, Canada and UK



(Source: Tek Narayan Maraseni, Jiansheng Qu, Jingjing Zeng, 2015.)

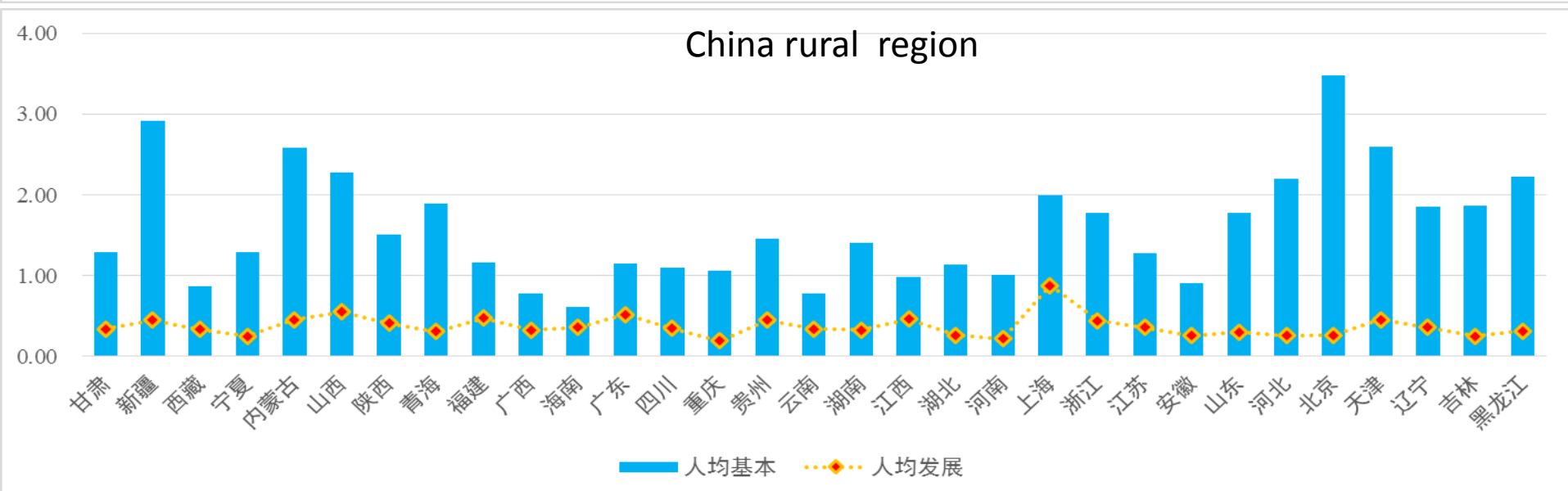
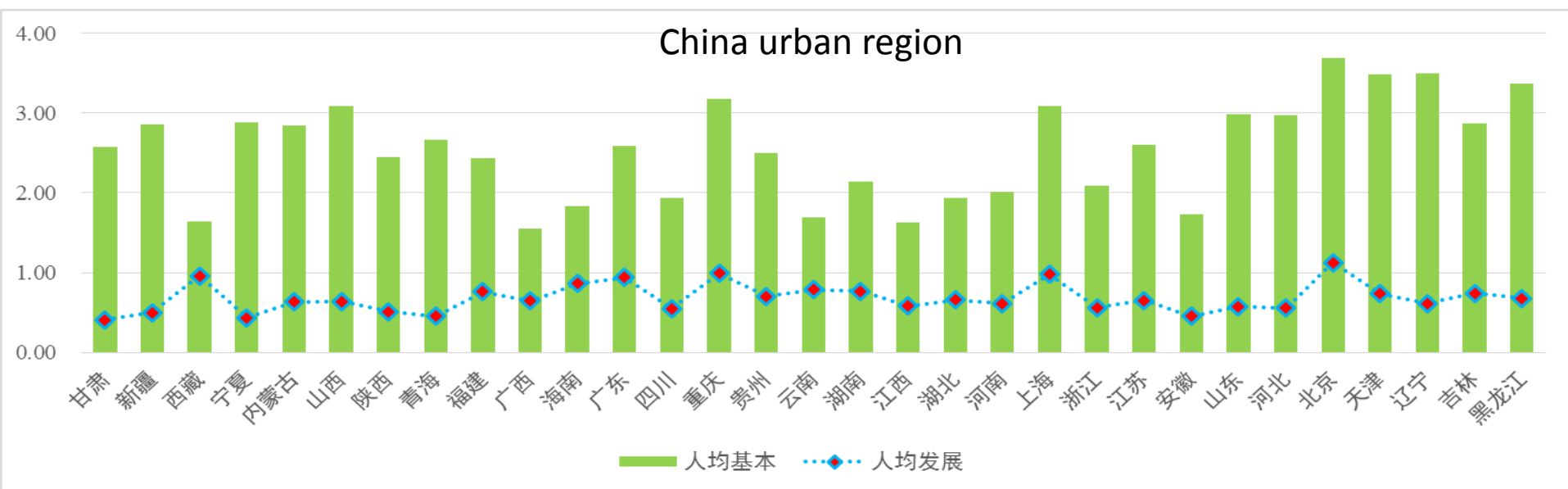
Household Carbon Emission in China

—Based a Survey Research

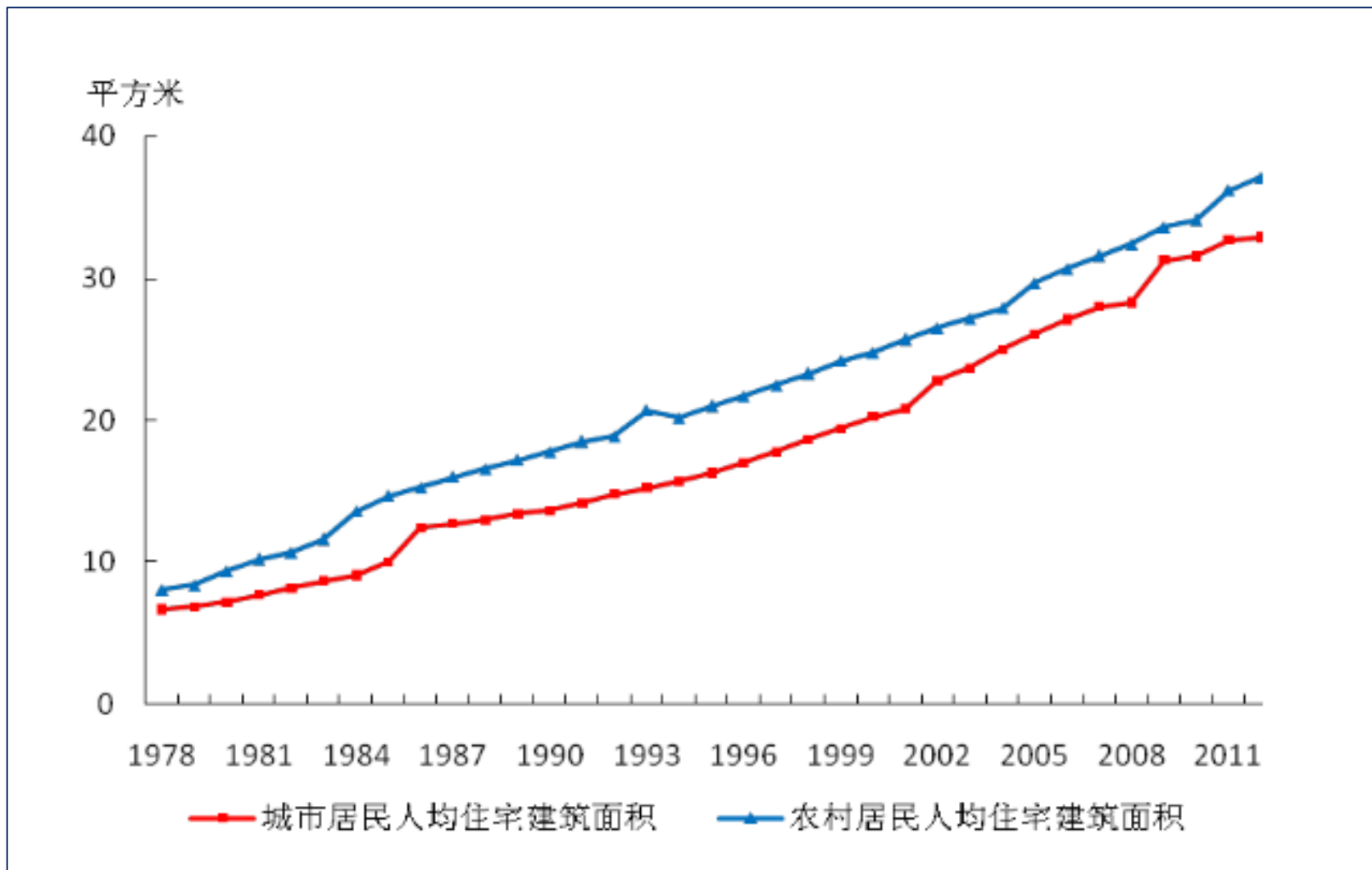


Household Carbon Emission in China

Emission structure: Base demands vs development demands



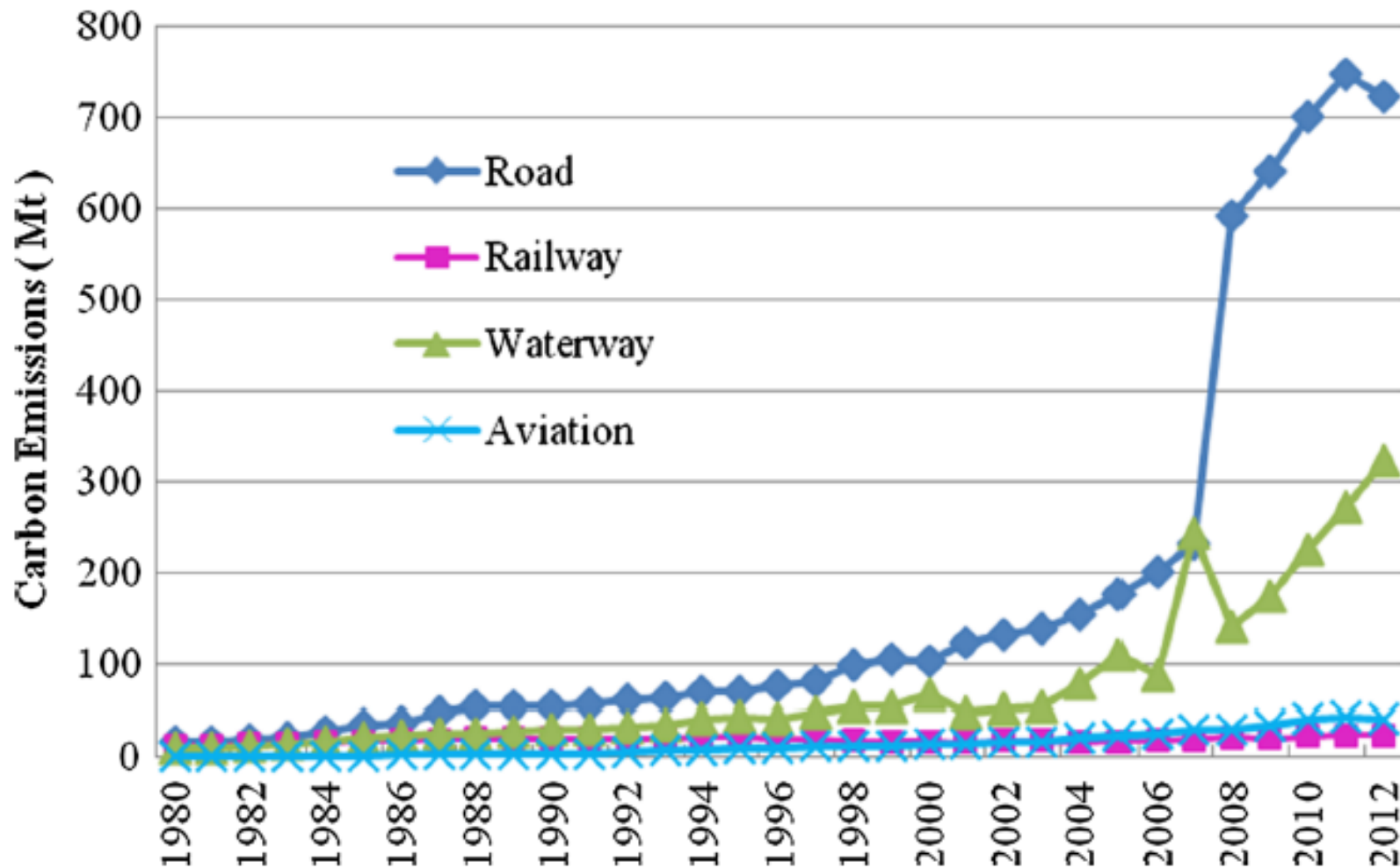
Housing conditions in China



House area per capita of urban/rural regions in 1978-2012 in China

Source: China Statistical Yearbook

Transportation Infrastructure in China

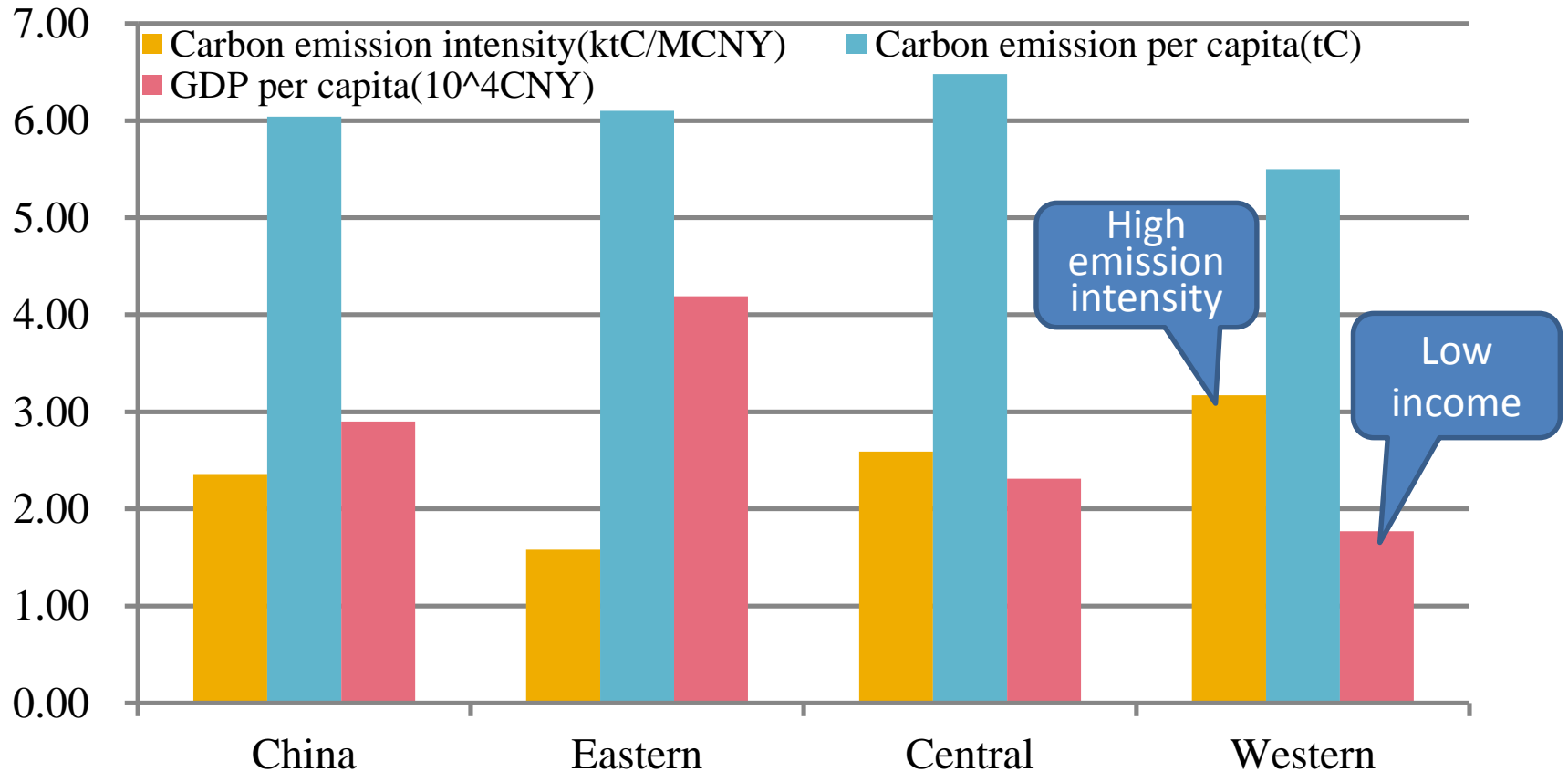


The CO₂ emissions in China's four transport sub-sectors over 1980–2012

Source: Zhao Liu , Ling Li , Yue-Jun Zhang. Investigating the CO₂ emission differences among China's transport sectors and their influencing factors[J]. Nat Hazards (2015)

Opportunities and Challenges for Under-Developed Regions in China

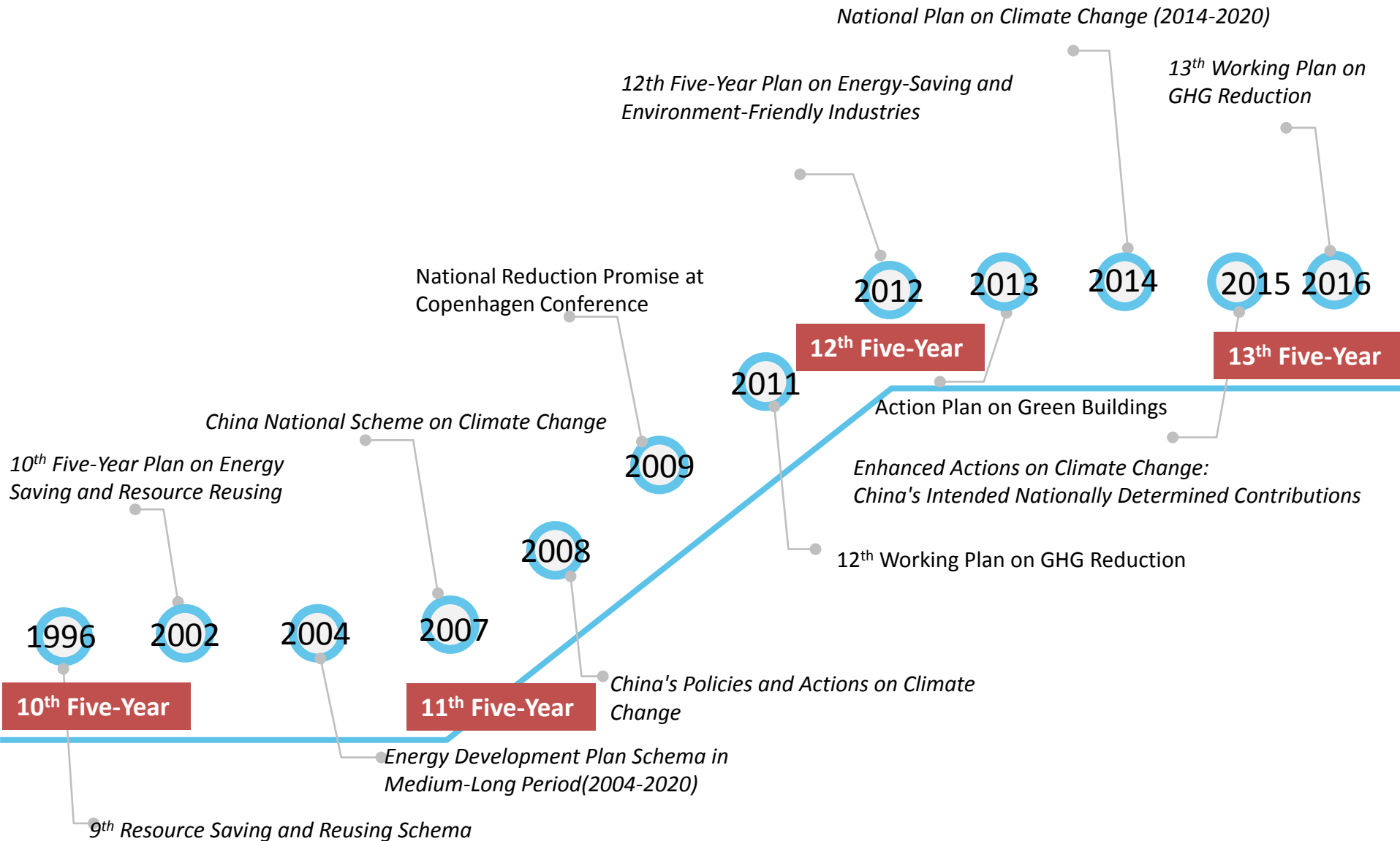
Obvious development gaps exist between different regions in China



Reality: Low GDP per capita and high carbon emission intensity in underdeveloped western China

Conflict: Great effort of carbon emission reduction and livelihood improvement/development

China Climate Related Policies in the Past 20 Years



Key achievements on carbon reduction in the past 10 years

periods	targets	achievements
The period of the 11th Five-Year Plan	To reduce the national energy consumption per GDP to 20% of the level of 2005	the national energy consumption per GDP was reduced to 19.1% of the level of 2005
The period of the 12th Five-Year Plan	To reduce the national carbon intensity per GDP to 17% of the level of 2005	the national energy-based carbon emission per GDP was reduced to 20% of the level of 2005

Main National 13th Five-Year Plan Related to Climate Change

Plans	Main Tasks
National Plan on Climate Change (2014-2020)	GHG Reduction; Adaptation to Climate Change; pilot project; Improvement of the regional policy.
National Plan on Modern Agriculture(2016-2020)	Agriculture environment protection; Agriculture waste management; Water/Soil pollution management.
13 th Five-Year Plan on National Electric Power Industry	Clean and green growth; New energy development; Multiple energy system.
13 th Five-Year Plan on National Sci & tech Innovation Plan 13 th Five-Year Working Plan on GHG Reduction	Energy revolution for Low Carbon Low-Carbon Industry System Low-carbon Urbanization Regional Low-carbon Development National Carbon Trade System
13 th Five-Year Plan on Forest Development	To Enhance the Forest Carbon Sink To reduce the Emission from the Forest Industry To Improve Forest Carbon verification To Promote Forest Carbon Trade
13 th Five-Year Plan on Transportation	Low-carbon and Low-Pollution Development of the Transportation;

Main Tasks of Thirteenth Five- Year Plan on Climate Change

GHG
Reduction

A

Adaptation/
Resilience to
Climate
Change

B

Widely
International
Cooperation

C

Green Development and Ecological Civilization

13th Five
Year Plan

- Addressing mitigation and adaptation in two hands;
- To reduce carbon emission actively, and to achieve the carbon reduction commitment;
- Improve the adaptation capacity;
- Contribution to the global governance.

Main Targets of National Plan in the Next 5 Years

- To reduce the carbon emission per GDP to 40-45% of the level of 2015 by 2020;
- To reduce the carbon intensity to 60-65% of the level of 2005 by 2030.



01

to reduce carbon intensity per GDP



02

to increase new energy

- To increase the ratio of non-fossil energy to 15% by 2020;
- and 20% by 2030.

04

Built carbon trade system



- National carbon trading system should be in operation by 2017.

03

to accelerate to realize the carbon peak



- To realize the national carbon peak by 2030;
- To encourage the regions in good conditions to achieve the peak before 2030.
- To realize the peak in partially heavy/chemical industries
- To enhance the forest carbon sinks.

Main Actions of National Plan in the Next 5 Years

A active, high-efficient, Open and transparent carbon trade system runs well by 2020

To build the carbon trade system and keep it in high efficiency

To enhance the low-carbon innovation

To keep funding the climate science research, to promote low-carbon R&D activities, and to support technology transfer and demonstration

To improve the regulation system; to enhance the GHG emission verification; to build the emission report system; to strengthen the capacity building.

To strengthen the basic capacity supports

To deliver the low-carbon lifestyle

To encourage low-carbon consumption; to address low-carbon activities; and to promote low-carbon transportation.

Main Indicators in the next 5 year Related to Climate Change

Low carbon energy revolution
(by 2020)

total energy consumed	Controlled within 5 billion tons of standard coal
Energy consumption per unit of GDP	15% lower than that in 2015
proportion of non-fossil energy sources	Reach 15%
Natural gas proportion	Up to 10%

Build low carbon industry system
(by 2020)

Proportion of the added value strategic emerging industries	Up to 15%
Unit of industrial added value of carbon dioxide emissions	22% lower than that in 2015
Agricultural construction waste disposal facilities	More than 75%
forest coverage rate	Reach 23.04%

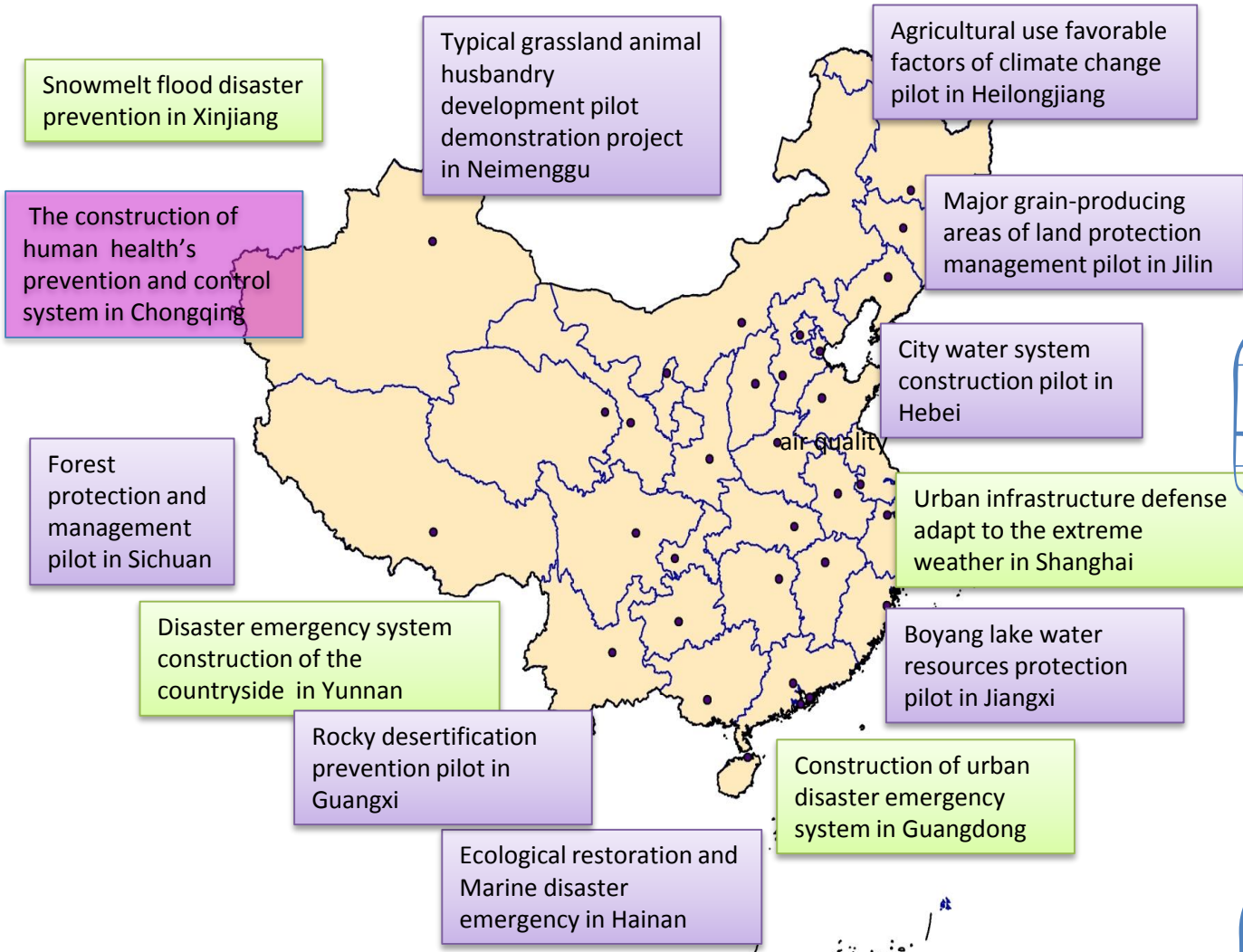
Promote the regional low carbon development
(by 2020)

Green buildings accounts for the proportion of new buildings	Reach 50%
co2 emissions of highway unit quantity	13% lower than that in 2010
co2 emissions of railway transport unit of work	15% lower than that in 2010
co2 emissions of water unit for turnover	13% lower than that in 2010
co2 emissions of Civil aviation units for turnover	11% lower than that in 2010

Promote low-carbon development of urbanization (by 2020)

1. Execute the classified guidance for carbon intensity control.
2. Promote some area reach the point firstly.
3. Innovative pilot demonstration area of low carbon development.
4. Support the development of low carbon in poverty-stricken areas.

Adaptation Tasks in the next 5 year



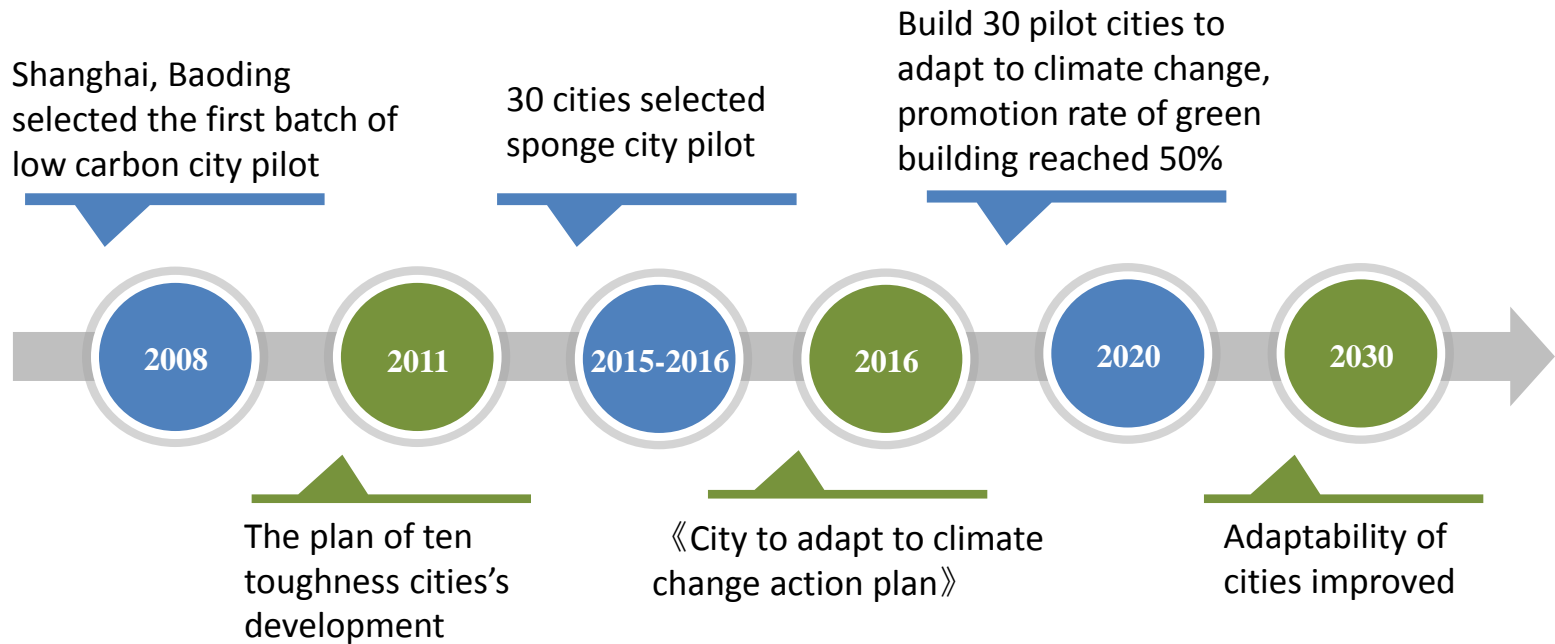
Improve the adaptability of the urban and rural areas, forestry, marine and coastal zone and ecologically fragile regions

Improve the health adaptability of the crowd

Improve the ability to deal with extreme weather and climate events

Strengthen the construction of disaster prevention and mitigation system

Adaptation Efforts in Cities



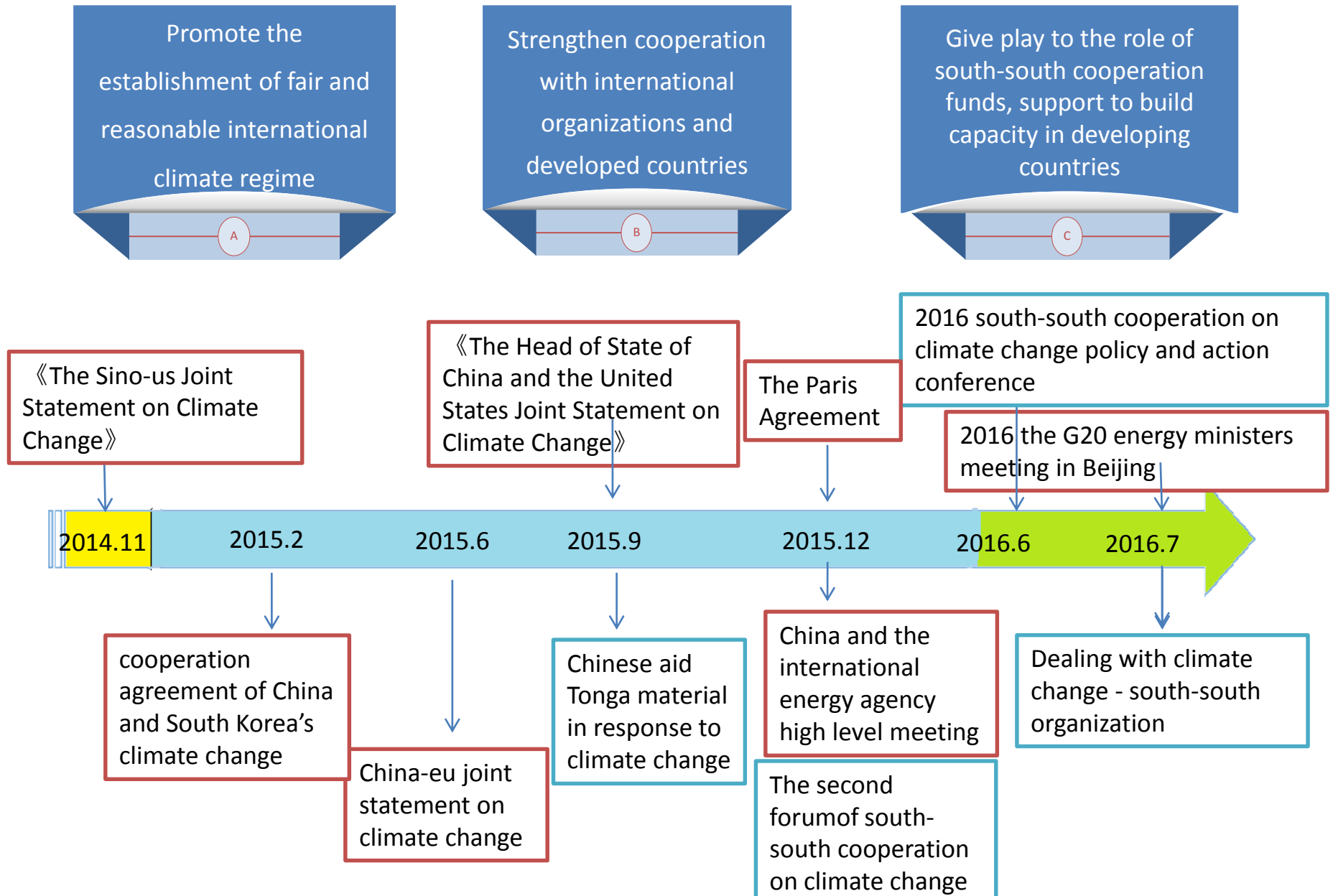
The fundamental objective: development concept of traditional cities and transformation of urban planning, construction, and the management idea

顾朝林. 建设科技, 2010 王祥荣, 韧性城市, 2016

中国建设部

http://www.cnenergy.org/yw/201602/t20160224_275132.html

International Cooperation Tasks in the next 5 year



Low-carbon Pilot Tasks in the next 5 year

Construction of the first batch of low-carbon city pilot

The National Development and Reform Commission had low carbon provinces and low-carbon urban pilot work in five provinces and eight cities in July 2010.

Key towns green and low-carbon

The Department of Housing identified eight towns as the first batch pilot of green low carbon key towns in June 2011⁵.



Low-carbon Pilot Tasks in the next 5 year



Construction of the second batch of low-carbon city pilot

The national development and reform commission carried out the second batch of low carbon provinces and low-carbon urban pilot work, adding 28 cities and Hainan province⁵.

construction of the third batch of low-carbon city pilot

The national development and reform commission will announce the third batch of low carbon city pilots in November 2016.

City	Local policy document of Low carbon city in China construction (portion)	颁布时间
Baoding	Pilot implementation plan of low-carbon city in Baoding, Hebei Province	2010 ¹⁰
	Implementation plan for carrying out green building operations and promoting the development of low-carbon Baoding, Hebei Province	2013 ¹¹
Xiamen	Programme for General Planning of low-carbon city in Xiamen, Fujian Province	2010 ⁵
Tianjin	The 12th five-year plan of dealing with climate change and promoting low-carbon economy and its development in Tianjin	2013 ⁵
	Pilot implementation plan of low-carbon city in Tianjin	2011 ¹²
Hangzhou	The decision to build the low-carbon city	2009 ¹³
	The 12th five-year plan of low-carbon city development in Hangzhou, Zhejiang Province	2011 ¹⁴
Nanchang	Development plan of low-carbon city in Nanchang, Jiangxi Province	2012 ¹⁵
	Promotion rules of low-carbon city development in in Nanchang, Jiangxi Province	2015 ¹⁵
Guiyang	Pilot implementation plan of low-carbon city in Guiyang, Guizhou Province	2013 ¹⁶
Chongqing	The 12th five-year pilot implementation plan of controlling greenhouse gas emission	2014 ¹⁷
Shenzhen	Middle& long term plans on low-carbon city development in Shenzhen (2011—2020)	2012 ¹⁸
	Green low-carbon port construction plan for five years in Shenzhen, Guangdong Province (2016-2020)	2016 ¹⁹
Suzhou	Low-carbon city development planning in Suzhou, Jiangsu Province	2014 ²⁰
Guangzhou	Low-carbon ecological city construction special planning guidance in Guangdong Province	2014 ²¹
Beijing	The 13th five-year plan of energy-saving and dealing with climate change in Beijing	2016 ²²
Ningbo	Pilot implementation plan of low-carbon city in Ningbo, Zhejiang Province	2013 ²³
Urumqi	Pilot implementation plan of low-carbon city in Urumqi, Xinjiang province	2014 ²⁴

11. http://www.hebjs.gov.cn/xinxi Gongkaipingtai/xinxi Gongkaimulu/gzdt_xxgkml/tbgs_xxgkml/201507/t20150724_195809.html

12. <http://www.bd.gov.cn/index.do?view=search&fields=title,title2,summary,contents&keyword=低碳城市&page=2>

13. http://www.tj.gov.cn/zwgk/wjgz/szfbgtwj/201203/t20120330_174424.htm

14. <http://dtfz.ccchina.gov.cn/Detail.aspx?newsId=45742&TId=171>

15. http://gongbao.nc.gov.cn/articleDetail.do?article_id=ea49e10d-2c23-4e8f-8b1a-f5c347e71759

16. http://xxgk.gygov.gov.cn/xxgk/jcms_files/jcms1/web18/site/art/2013/4/15/art_2961_97305.html

17. <http://www.cq.gov.cn/publicinfo/web/views/Show!detail.action?sid=3939195>

18. http://www.baidu.com/link?url=GowRFx9jMxiWpstEOZn4Wim-gRJaA5-W4CnqcmiXt5f08j5fwjhEJVNePBpzAKdxe5yACatrnqCLDrIYGQArc62yCv3M01pJc_89L0F2r7&wd=&eqid=d091f38200020eb6000000035823960e

19. <http://hk.lexiscn.com/law/law-chinese-1-2868466.html>

20. http://www.fgw.suzhou.gov.cn/szfgw_new/infodetail/?infoId=321c9bfd-3ec3-4dee-8ed8-4208543ee188&categoryNum=025001

21. http://www.gzepb.gov.cn/yhxxw/201505/t20150526_80193.htm

22. http://govfile.beijing.gov.cn/Govfile/front/content/12016034_0.html

23. http://govinfo.nlc.gov.cn/zjsnbfz/nbgf/75355a/201304/t20130428_3568510.html

24. <http://www.urumqi.gov.cn/gk/zfwj/2014n/198914.htm>

China Carbon Trade System

Paris convention on climate change on Nov. 30th, 2015

Preparation period of carbon emissions trading market in 2016

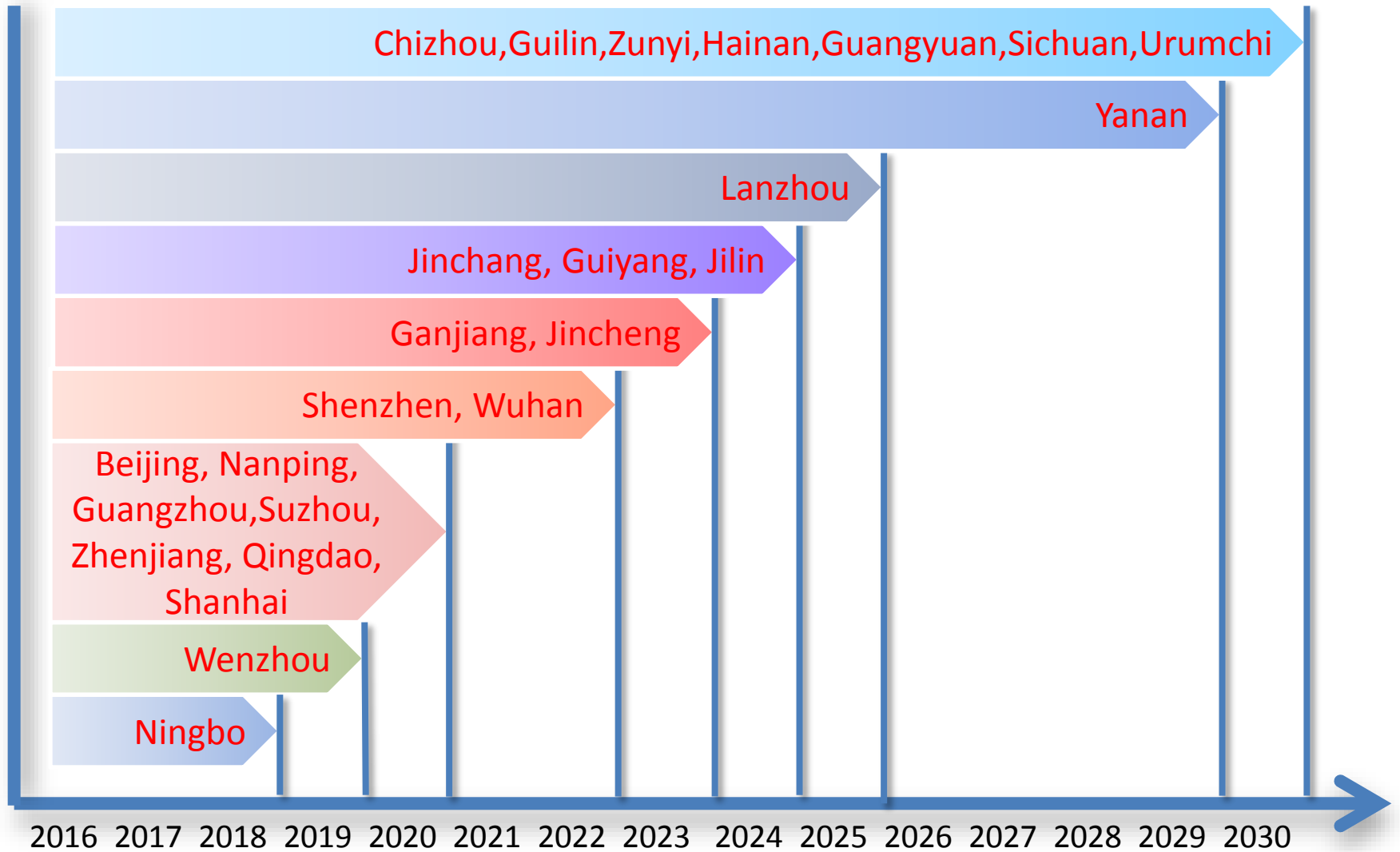
Launched a national carbon emissions trading system in 2017



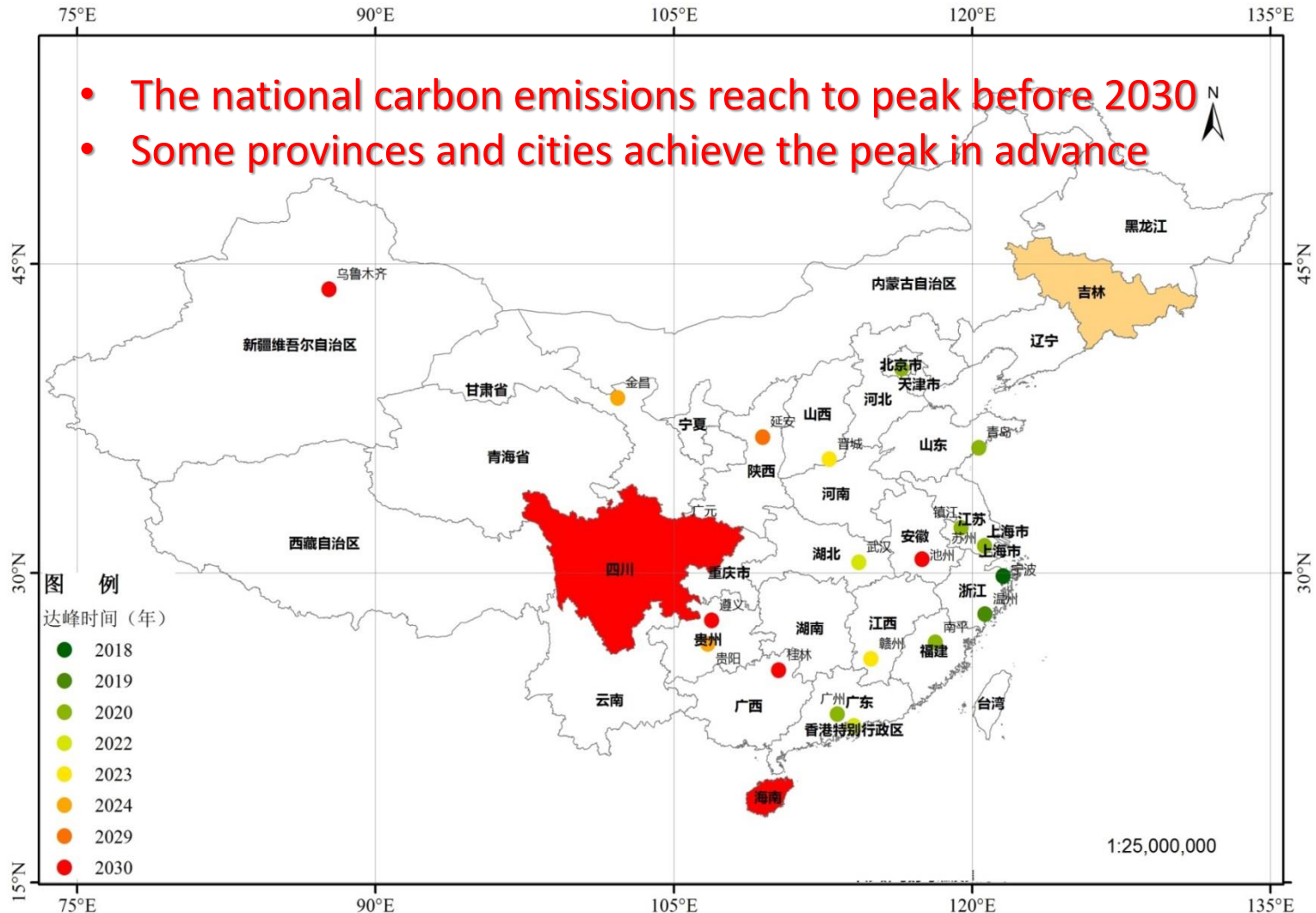
**2016-2020:
operation perfectly**

**After 2020:
stabilization and
deepening**

Carbon Emissions Peak



Carbon Emissions Peak



来源: APPC中国达峰先锋城市峰值目标及工作进展 2016,

<http://appc.ccchina.gov.cn/archiver/APPC/UpFile/Files/Default/20160707172658171492.pdf>

Thanks for Your Attention

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