International Forum on Low Carbon Cities

Assessing and Tracking China's Carbon Peak and Neutrality Policy Efforts

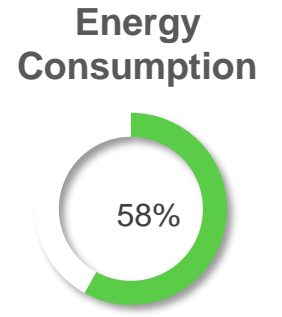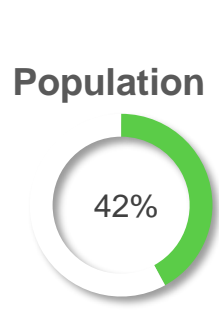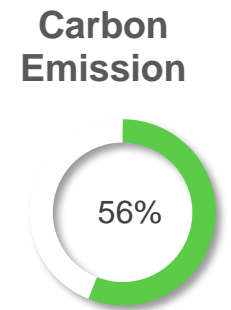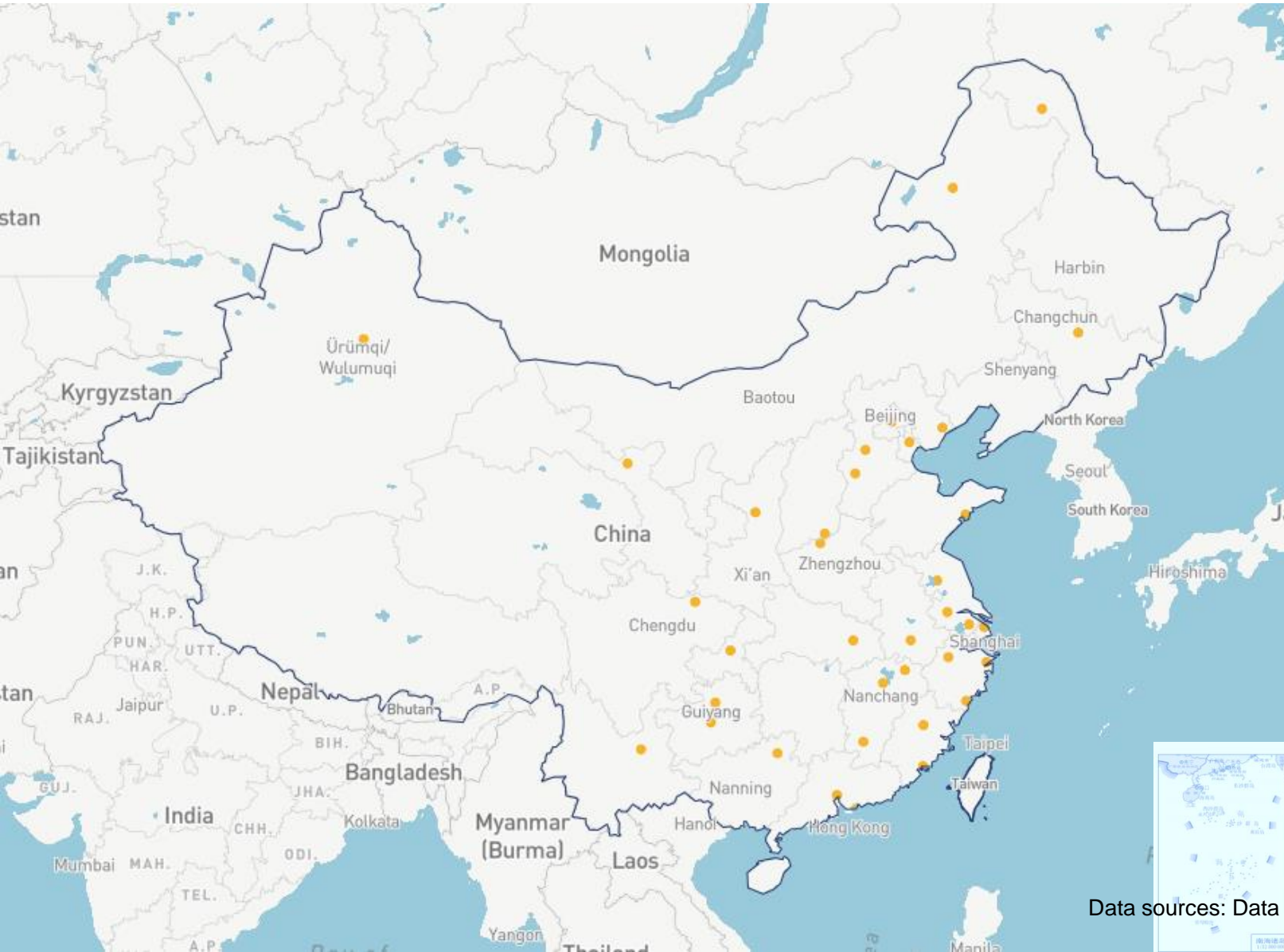Xueye Liu

Innovative Green Development Program

24 November 2021

iGDP

China's Low-carbon City Pilots

GDP
57%

Carbon Emission
56%

Population
42%

Energy Consumption
58%

15 Cities Committed to peaking carbon emissions by 2020

City	Commitment Release Time
Yantai	-
Ningbo	2016
Dunhuang	-
Wenzhou	2013
Beijing	2015
Guangzhou	2015
Hangzhou	2014
Huangshan	2017
Jiyuan	2014
Jinhua	-
Qingdao	2016
Xiamen	-
Suzhou	2014
Wuzhong	-

National Peaking Target

Data sources: City plans, US-China Climate City Summit, research reports
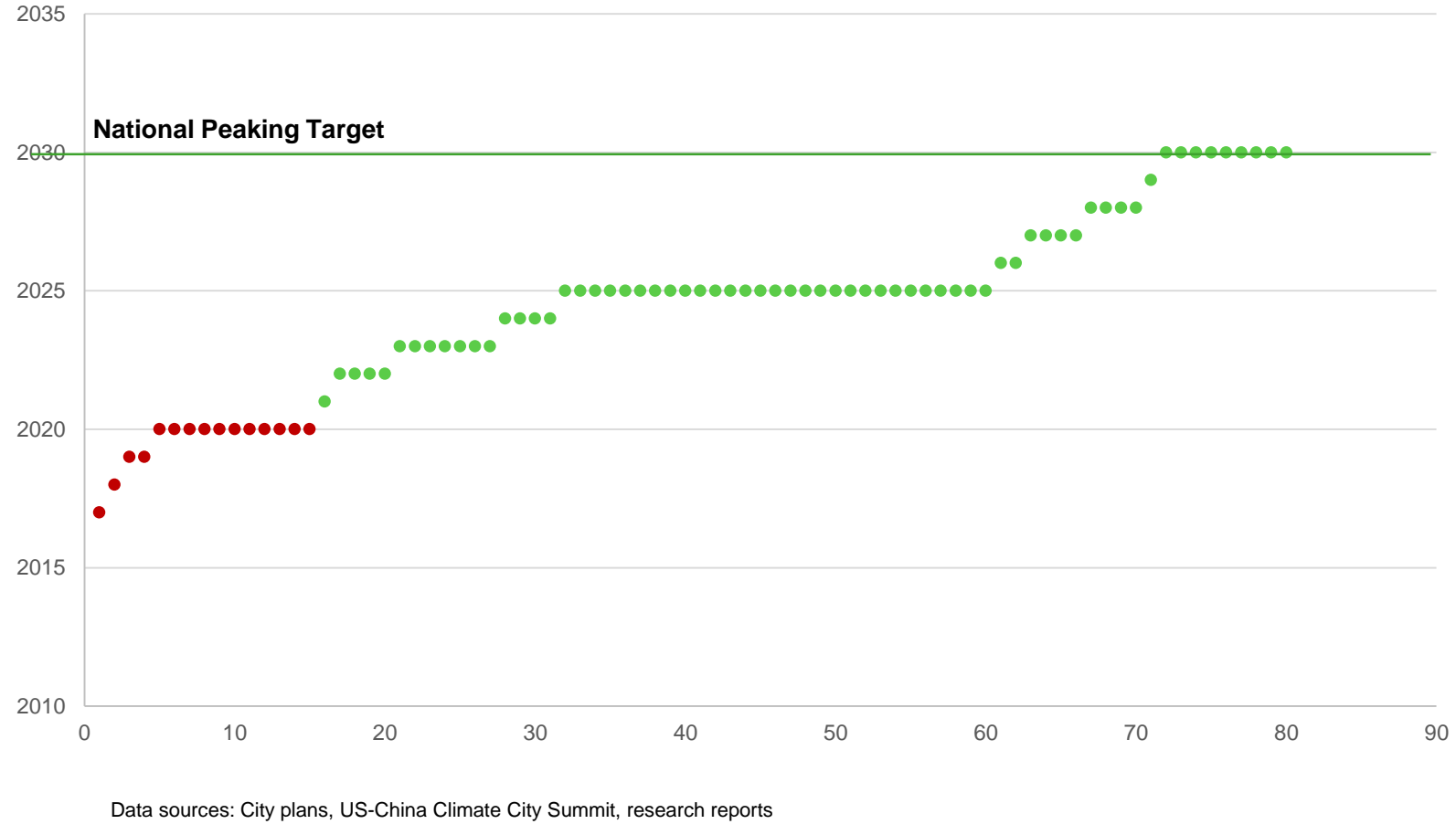
GDP Per Capita (2019) above the National Average, CO$_2$ Emission Per Capita Distribute evenly

CO2 per capita (ton/cap 2019)

Ningbo

Jiyuan

Suzhou

Zhenjiang

Hangzhou

Guangzhou

Qingdao

Jinhua

Wenzhou

Beijing

Xiamen

Huangshan

GDP per capital   (USD curent price 2019)
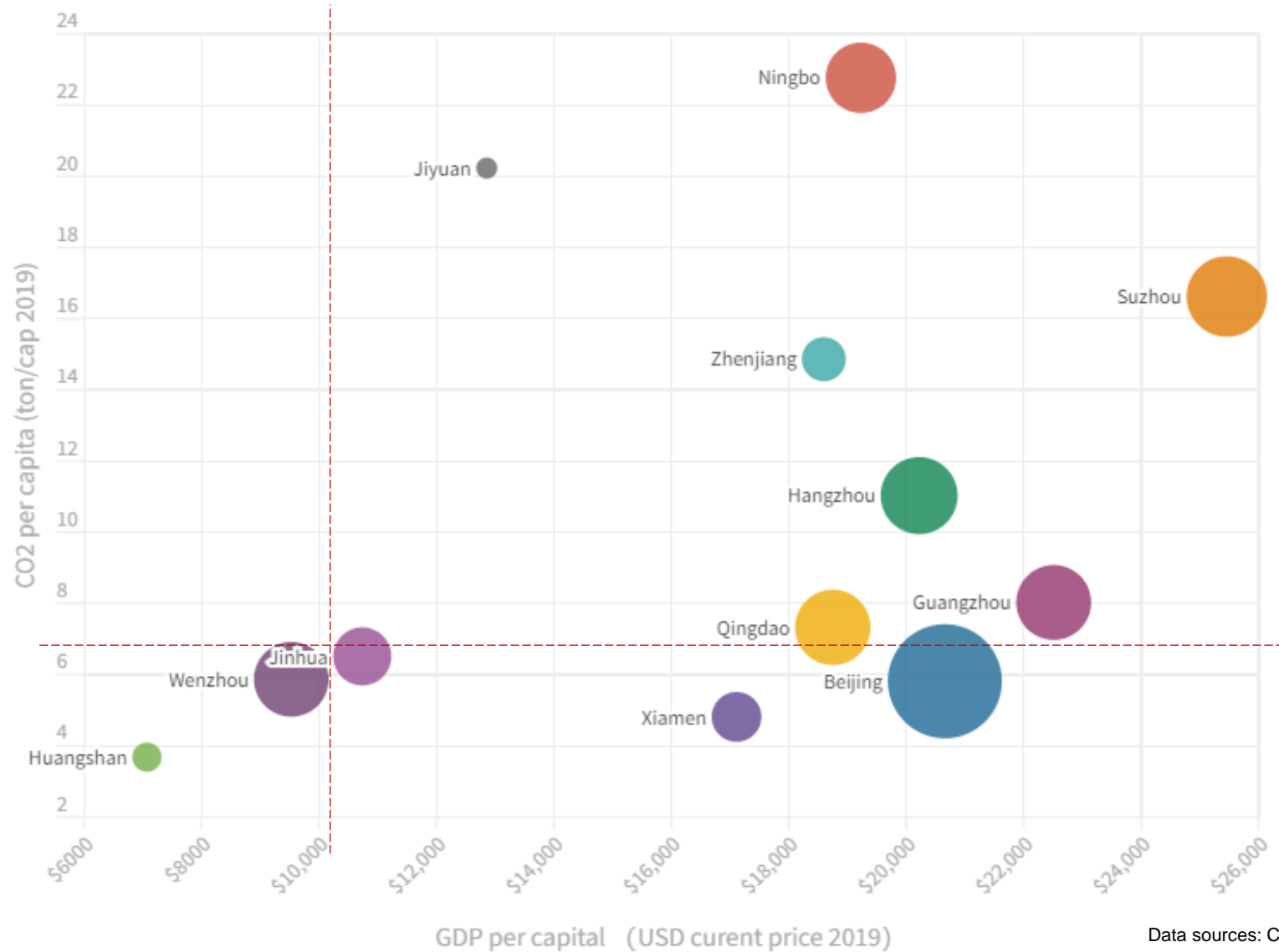
Data sources: City Statistical Yearbook, City plans, research reports

iGDP

Early Peaking Cities Fit the Kuznets Curve

iGDP

Kuznets Curve for CO$_2$ per capita in the 12 Commitment Dacorum cities, 2000-2019
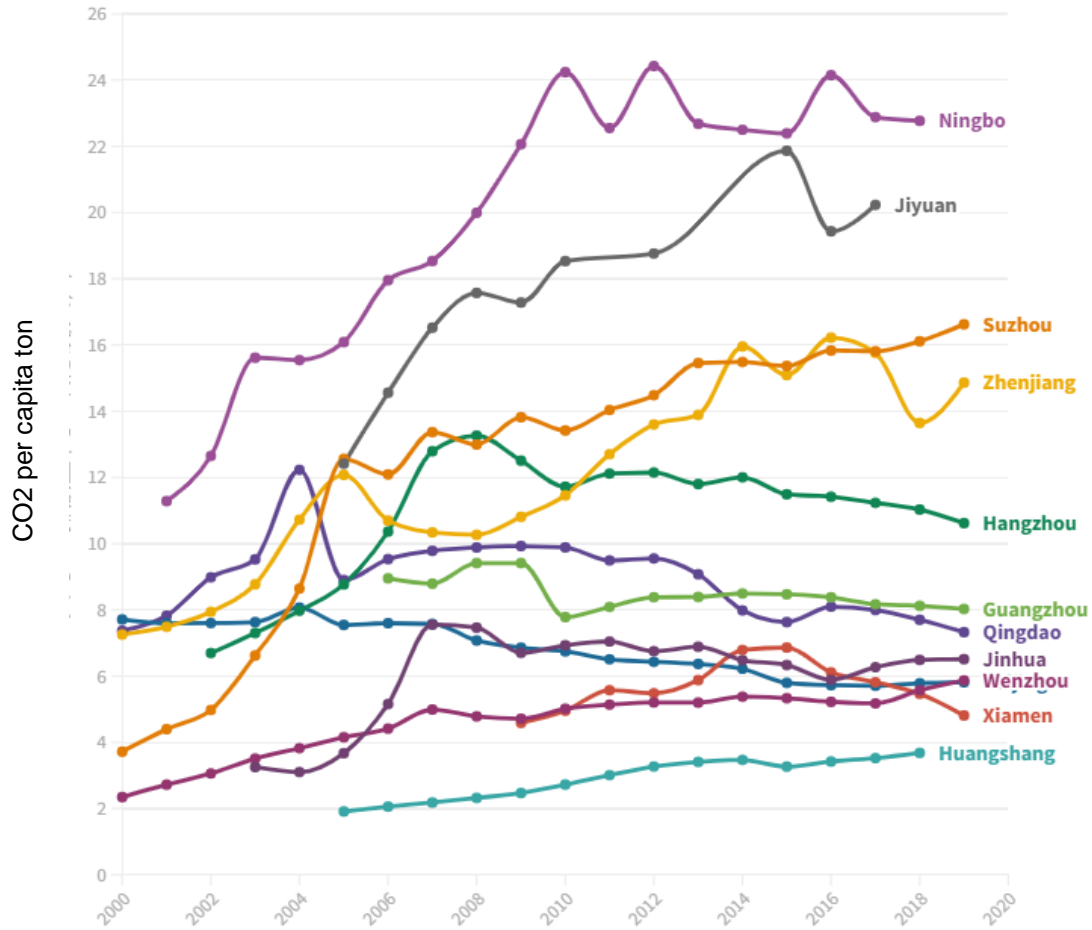
Per capita CO2 emissions of 12 cities from 2000 to 2019

4 Cities Peaked , 4 Cities Plateauing, 4 Cities Had Not Peak

iGDP

Table of CO$_2$ Kuznets curve coefficients per capita for the 12 committed peak cities

|	City	C	R^2
1	Huangshan	-0.20	0.98
2	Jinhua	-1.21	0.84
3	Xiamen	-0.13	0.41
4	Qingdao	-0.38	0.70
5	Hangzhou	-0.81	0.88
6	Wenzhou	-0.39	0.99
7	Beijing	-0.43	0.86
8	Jiyuan	-0.37	0.93
9	Suzhou	-0.63	0.98
10	Ningbo	-0.48	0.96
11	Guangzhou	0.10	0.39
12	Zhenjian	-0.14	0.89

City	Maximum year	inflection point	Peaking Year	Minimum 5 years downward trend after maximum	Peaking	Commitment
Jinhua	2007	2012	2020	Y	Peaking	complete
Hangzhou	2008	2012	2020	Y	Peaking	complete
Qingdao	2004	2007	2020	Y	Peaking	complete
Beijing	2007	2005	2020	Y	Peaking	complete
Wenzhou	2017	2017	2019	-	plateau	remain to be seen
Suzhou	2018	2016	2020	-	plateau	remain to be seen
Jiyuan	2015	2016	2020	-	plateau	remain to be seen
Ningbo	2017	2017	2018	-	plateau	remain to be seen
Zhenjiang	2016	-	2020	-	N	N
Guangzhou	-	-	2020	-	N	N
Huangshan	2018	-	2020	-	N	N
Xiaman	2018	-	2020	-	N	N

Data sources: City plans, cities yearbook, research reports, UN. Energy related CO$_2$ only.

Below International Carbon Peaking Levels
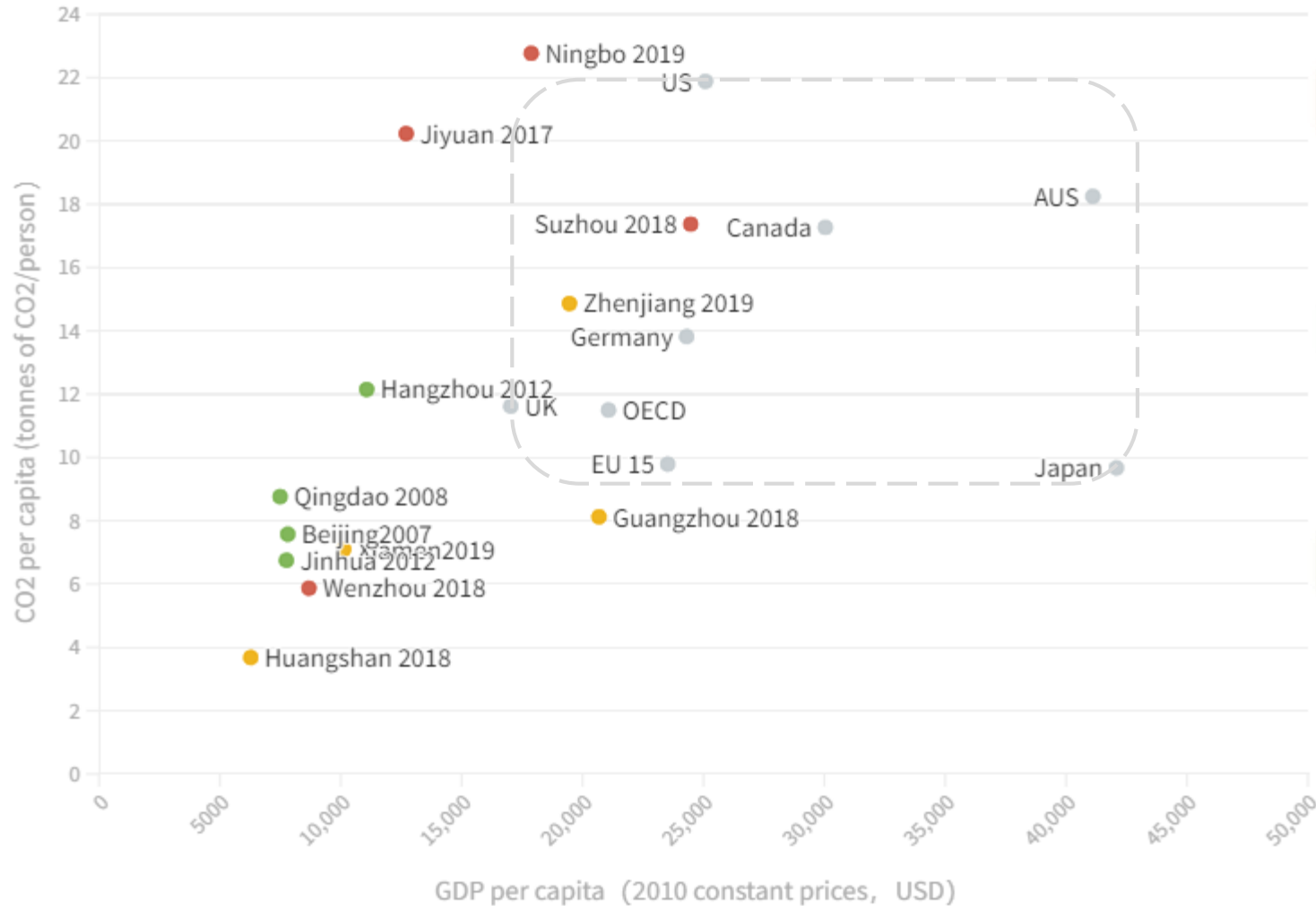
4 Peaked Cities——Low level peaking

Peak levels and GDP per capita lower than international peaked country or regional levels.

4 platform cities - expected to reach peak

CO_2 emission levels per capita vs. GDP per capita close to peak country or regional levels

4 unpeaked cities – could peak

GDP per capita is at the level of international peaking countries or regions. CO2 per capita is at a low level

Data Sources: City Plans, Cities Statistics Yearbook, Research Reports. UN. Energy Related CO_2 Only.

City Carbon Peak- Low Carbon and Green index

iGDP

Primary Categories	Secondary Categories
Low Carbon Management	2020 target of reducing carbon dioxide emissions per unit of regional GDP compared with 2015
	Low carbon/climate change legislation
	Low-carbon/climate change special development plan
	GHG Inventory
	Greenhouse gas statistics and accounting of key energy-using units
	MRV data platform for companies
	Carbon assessment and review system for fixed asset investment projects
	Special funds for low-carbon development
	ETS pilot
Energy	Unit of GDP energy consumption goal
	Target of the total amount of primary energy consumption
	Target of the total amount of coal consumption
	Energy development planning
	New energy development planning
Industry	Local industrial energy conservation legislation, transformation and upgrading plan
	Local industrial energy efficiency standard
	Ten thousand enterprises energy-saving low-carbon action

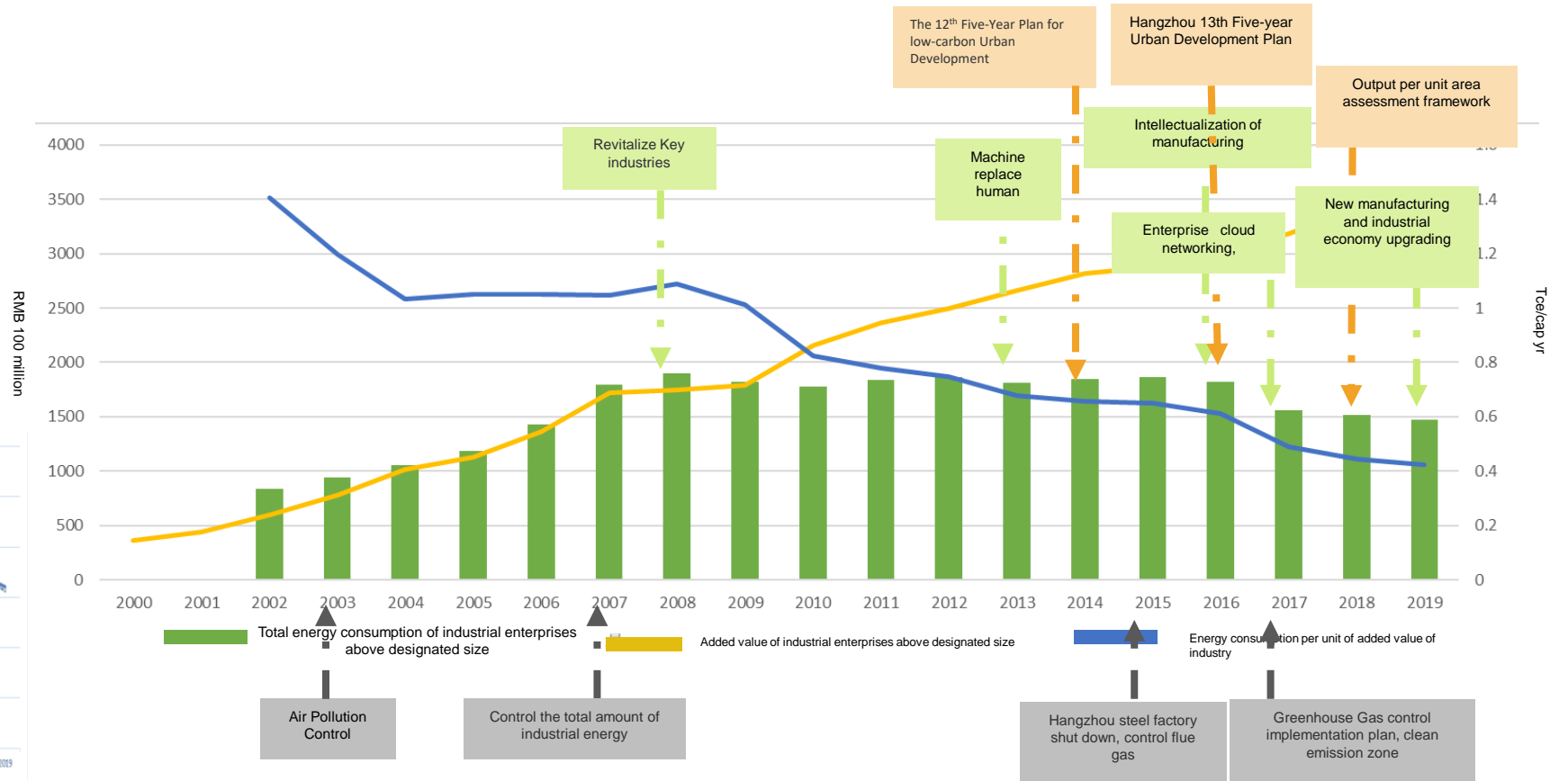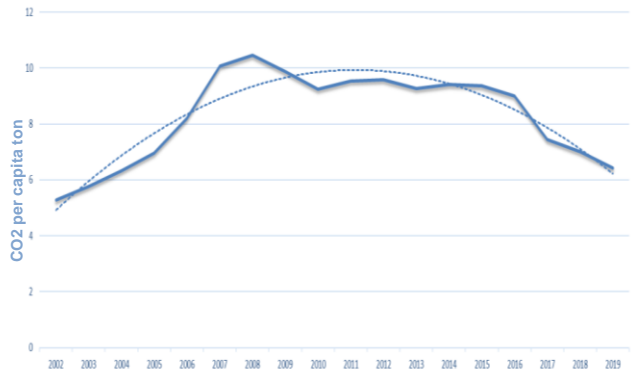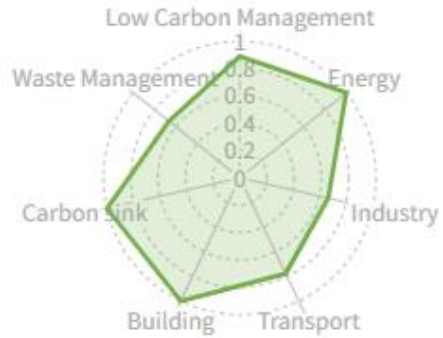| Primary Categories	Secondary Categories
Transport	Low Carbon Transport Planning
	Public transport sharing
	New Vehicle license control
	Vehicle restriction policy
	Transport orient development planning
	Public bike sharing
	Biking and walking network
	New energy vehicles development planning
	Different parking policy
Building	Local building Efficiency standard
	Local regulation of building efficiency
	Public building Energy consumption audit
	Local green new building mandatory standard
	Large scale utilization of building renewable energy
	Green Building share
	Local Green new building label
Carbon Sink	Urban forest planning
	Forest coverage
	Forest Volume
Waste Management	Waste management policy
	Harmless treatment of life waste
	Utilization rate of solid waste

Based on iGDP- LOGIC TOOL

Scores of Peaked Cities are Better than Other Cities

City	Low carbon management	Energy	Industry	Transport	Building	Carbon sink	Waste Management	score
Beijing	9	5	3	9	6	3	3	38
Guangzhou	9	5	3	8	6	2	3	36
Hangzhou	8	5	2	8	6	3	2	34
Ningbo	8	3	2	7	5	3	3	31
Zhenjiang	7	5	2	7	3	2	2	28
Qingdao	7	1	1	7	6	2	3	27
Wnezhou	7	4	0	5	4	3	3	26
Xiamren	7	3	0	7	3	2	3	25
Jiyuan	6	2	3	5	4	1	2	23
Suzhou	6	1	1	7	4	1	3	23
Jinhua	2	0	1	7	2	2	2	16
Huangshan	2	0	2	3	3	2	2	14
average score	6.5	2.8	1.60	6.6	4.3	2	2.58	26.5

Hangzhou- Peaked

Radar chart axes: Low Carbon Management, Energy, Industry, Transport, Building, Carbon Sink, Waste Management

Y-axis (left): RMB 100 million — 0, 500, 1000, 1500, 2000, 2500, 3000, 3500, 4000

Y-axis (right): Tce/cap yr

X-axis: 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019

CO2 per capita ton

Annotations (orange boxes):
- The 12th Five-Year Plan for low-carbon Urban Development
- Hangzhou 13th Five-year Urban Development Plan
- Output per unit area assessment framework

Annotations (green boxes):
- Revitalize Key industries
- Machine replace human
- Intellectualization of manufacturing
- Enterprise cloud networking,
- New manufacturing and industrial economy upgrading

Annotations (grey boxes):
- Air Pollution Control
- Control the total amount of industrial energy
- Hangzhou steel factory shut down, control flue gas
- Greenhouse Gas control implementation plan, clean emission zone

Legend:
- Total energy consumption of industrial enterprises above designated size
- Added value of industrial enterprises above designated size
- Energy consumption per unit of added value of industry

Key Findings

Peak commitment is a prerequisite for city carbon peak

Policy implementation needs to be improved

Urban low-carbon transformation and economic development can be win-win

Policies do not match key field of emission reduction

Urban low-carbon transformation strongly promoted high-quality urban development

Policies in the transport and construction sectors should consider carbon neutrality

Latest Tools Under Development——LOGIC & CCNT

Summary

- **Before 2019, 15 cities committed to hit peak, we assess this process with the Kuznets curve and our policy assessment tool, more than half of them could complete the commitments.**

- **To track China carbon neutrality , we are updating our new online tools from Policy Mapping to China Carbon Neutrality Tracker and will release our next LOGIC assessment report in one year.**

http://logic.igdp.cn/

https://ccnt-igdp.netlify.app/en

Thanks

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