

# Low-Carbon Cities in China: Alliance of Peeking Pioneer Cities Action Factsheet

Over half of China's population resides in cities, which are responsible for consuming around 85% of China's total energy use and emitting more than 90% of China's carbon dioxide (CO<sub>2</sub>) emissions (Weiguang Wang et al., 2013). Unlike cities in developed countries, the industrial sector is still the main source of CO<sub>2</sub> emissions in China's cities. Emissions from the transportation and building sectors are projected to increase dramatically as China's urbanization will bring more than 350 million people to cities in the next 15 years. Low carbon development of China's cities will be critical to achieve the nation's climate mitigation goals and to maintain global climate stability.

China's national government and an increasing number of local leaders recognize the importance of the low-carbon development alternative. Since 2010, various regulations and policies from both central and local governments have been piloted and implemented to improve industrial energy efficiency, reduce building energy use, improve transportation fuel economy performance, and promote urban form strategies in favor of non-motorized travel. Clean energy supply and clean coal development policies are also essential for realizing low-carbon cities because fossil fuel is still the dominant energy source and is likely to remain so for some time. Chinese cities are also preparing for climate adaptation because of the increasing probability of more frequent climate change-related natural disasters.

China has initiated 42 low carbon pilots, including six provinces and 36 cities, which represent various geographic locations, resource endowments, economic growth patterns, industrial mixes, and energy-use behaviors. These pilots have developed and implemented long-term policies, programs, and measures to achieve low-carbon development at the provincial and municipal levels.

Low-carbon city collaboration was a component of the 2014 US-China joint climate change statement. The Alliance of Peeking Pioneer Cities (APPC) was established during the US-China Climate Leaders Summit in Los Angeles on September 15, 2015. Nine

cities -- Beijing, Wuhan, Jilin, Shenzhen, Guiyang, Zhenjiang, Guangzhou, Yan'an and Jinchang, were in the first group of APPC members. During the second US-China Climate Leaders Summit in Beijing, June 7-8, 2016, another twelve cities -- Suzhou, Ningbo, Wenzhou, Nanping, Qingdao, Jincheng, Guilin, Guangyuan, Zunyi, Chizhou, Ganzhou and Urumqi -- joined the APPC.

This factsheet draws on an analysis of actions taken in APPC members (from China's 42 low-carbon pilots). Benchmarking the low-carbon actions in these cities against international practices indicates that there is significant room for improvement in the following areas: (1) cities need to develop integrated quantitative analysis to understand carbon mitigation potentials across sectors to allow policymakers to prioritize actions based on cost effectiveness of various actions; (2) a peer learning and race-to-the-top mechanism should be developed to disseminate best practices among cities; (3) policies and standards in transportation, buildings and urban planning should be at least as strong as global leading practices, given the considerable challenge of maintaining current energy use levels while improving living standards; (4) improving energy efficiency promises the biggest mitigation potential in the short term; however, it is also important to get the infrastructure ready for long term clean energy technology deployment; and (5) most importantly, a smart financing platform should be established to introduce new economic drivers for capturing carbon mitigation potentials. These are the most practical solutions for success in the realization of low-carbon cities as China enters a period of slower economic growth.

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**Disclaimer:** The factsheets are compiled based on publically available data sources. The views and opinions expressed in this paper are those of the authors and do not necessarily reflect the organization, advisors and sponsors.

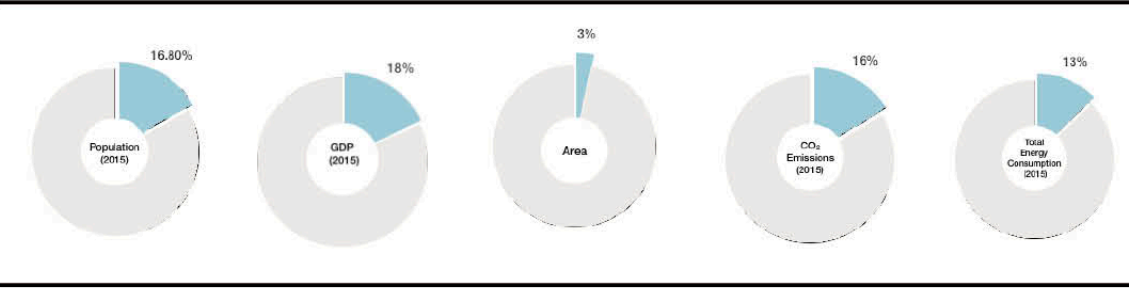
# Snapshot of China's Low-Carbon Pilots

China's 42 low-carbon pilots covered 37.33% of the national population, 53.39% of GDP and 21.21% of total urban area. In 2015, APPC member cities incorporated 16.8% of the national population, 18% of the GDP and 3% of the total urban area. APPC members emit 16% of all China's carbon emissions and consume 13% of the total national energy consumption in 2015.



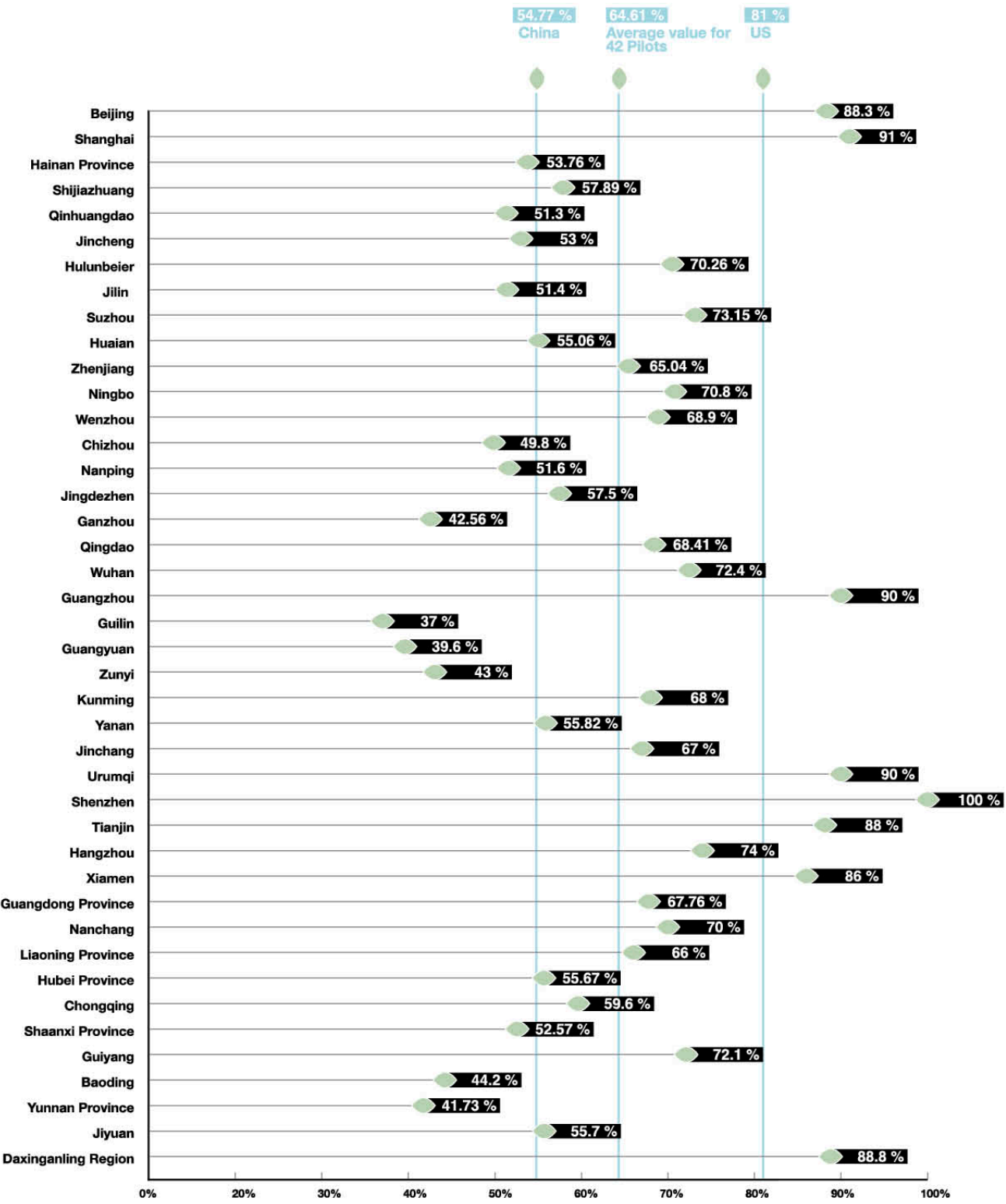
China's National Development and Reform Commission issued two executive orders in July 2010 and November 2012, together identifying 42 low-carbon pilots. The executive orders require these pilots to develop a low-carbon development action plan and a greenhouse gas (GHG) emissions inventory. The pilots must also establish a policy framework to promote carbon mitigation and clean economic growth.

## Basic Information of APPC Members



Data sources: 2015 Annual Statistical Reports of APPC members, 2015 China City Statistical Yearbook, websites of the Municipal Bureau of Statistics and APPC Secretariat.

# Difference in Urbanisation Rate of 42 Low Carbon Pilots (2014)

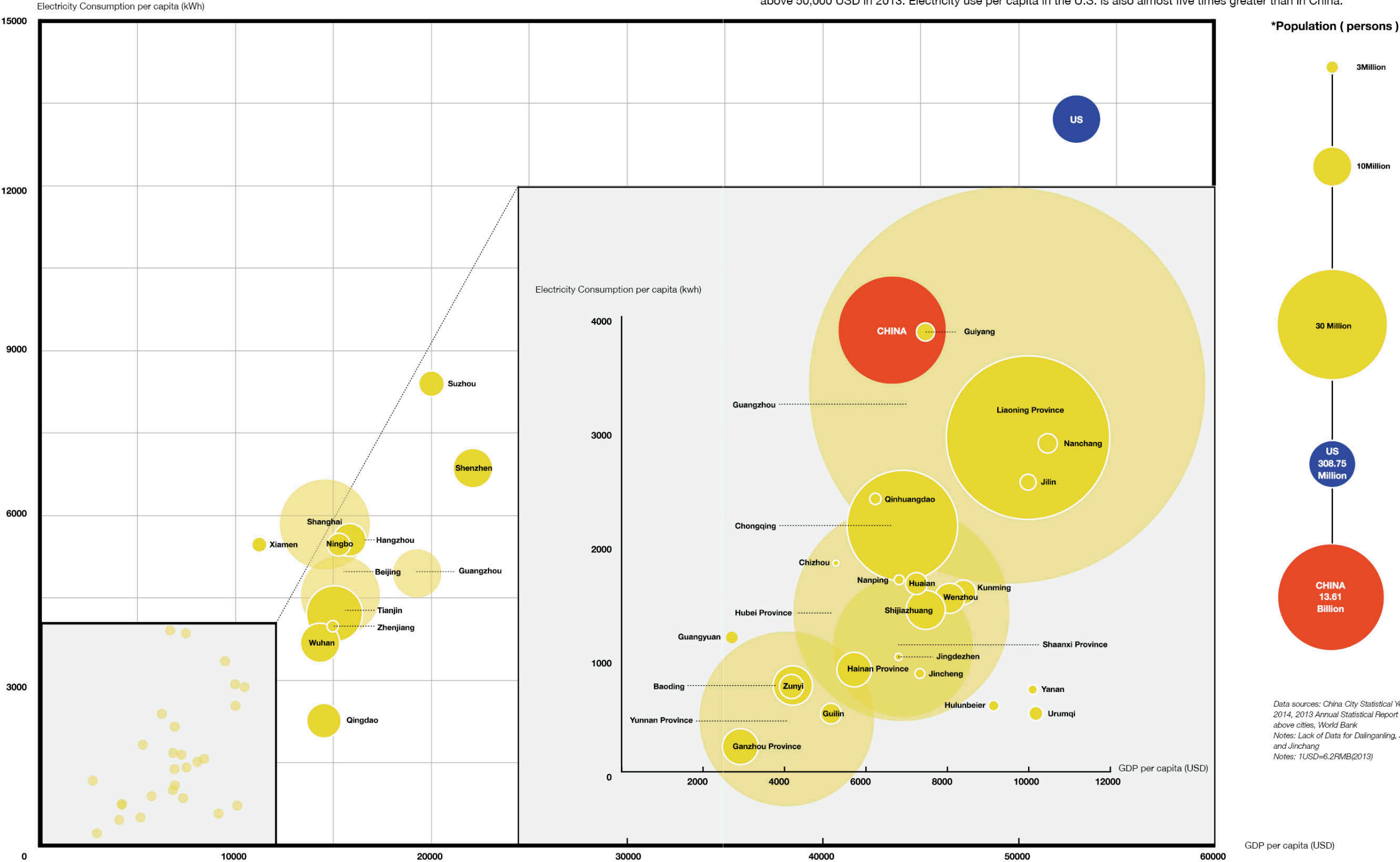


Data sources: 2014 Annual Statistical Report of the above cities, World Bank



# Energy Use and Economic Development Status For 42 Pilots (2013)

Per capita GDP of China's low carbon pilots vary significantly among regions. The highest per capita GDP is in Shenzhen, at above 20,000 USD; and the lowest GDP per capita is in Guiyang, at less than 3000 USD. Meanwhile the U.S. average was above 50,000 USD in 2013. Electricity use per capita in the U.S. is also almost five times greater than in China.



Data sources: China City Statistical Yearbook, 2014, 2013 Annual Statistical Report of the above cities, World Bank  
Notes: Lack of Data for Dalian, Jiyuan and Jinchang  
Notes: 1USD=6.2RMB(2013)

Since 2010, various regulations and policies of China’s central and local governments have comprised a systematic policy framework for low carbon development in cities. Cities need to implement carbon emissions mitigation goals, policies, rules, and standards set by provincial or national governments. Cities can also develop more stringent policies, standards, and innovative piloting programs and provide financial support to improve the implementation of all policies. The following table presents this framework, including national and sectoral policies influencing cities and city actions.

Policies and Practices for Low-Carbon City Development in China

National And Sectoral Policies Influencing City Actions		City Actions*	National And Sectoral Policies Influencing City Actions		City Actions*
Carbon Emissions Goals	National Target for Peaking Total CO <sub>2</sub> Emissions around 2030	Municipal Target to Peak Total Carbon Emissions	Industrial Energy Conservation Action Plans	Municipal Industrial Energy Conservation Action Plans	Industry
	National Target to Reduce CO <sub>2</sub> Emissions per Unit of GDP 40%-45% by 2020 and 60%-65% by 2030 from the 2005 Level	Municipal Targets for Reducing CO <sub>2</sub> Emissions per Unit of GDP	Energy Consumption per Unit of Industrial Total Value-added	Municipal Energy Consumption per Unit of Industrial Total Value-added	
	National Targets for Reducing Energy Consumption per Unit of GDP by 2015	Municipal Targets for Reducing Energy Consumptions per Unit of GDP by 2015	Mandatory Energy Efficiency Standards for Industry Equipment and Products	More Stringent Sub-national Standards	
	National Non-CO <sub>2</sub> GHG Emissions Reduction Programs	Municipal Non-CO <sub>2</sub> GHG Emissions Projects	Top Runner Program	Local Implementation Projects of Top Runner Program	
Climate Actions		Municipal Climate Change Legislation	Top 10,000 Energy Conservation Program	Energy Efficiency Audit and Benchmarking; Energy Manager Training; Energy Management Standards, etc.	Industry
	National Plan on Climate Change, Energy Conservation, and Low Carbon Development by 2015 and 2020	Municipal Low Carbon Development Action Plans Low Carbon City Pilot Work Plans	Financial Incentives and Rewards for Industrial Energy Efficiency	Financial Incentives and Rewards for Industrial Energy Efficiency	
	National GHG Emissions Inventory Development	Municipal GHG Emissions Inventory Development		Differential Electricity Pricing	
	National GHG Reporting and Registry Rules	GHG Reporting and Registry		Low Carbon Industrial Park Pilots	
		Carbon Emissions Data Platform	Energy Efficiency Improvement Target for Building Sector	Energy Efficiency Improvement Target for Building Sector	Buildings
	National Carbon Market Preparation	Carbon Market Pilot	National Guidelines for Energy Efficiency Retrofit Subsidies for Existing Buildings	Energy Efficiency Retrofit Subsidies for Existing Buildings	
Decarbonize Economic Development	National Plans and Goals to Promote Development of Service Sector	Policies to Promote Development of Service Sector	National Residential Building Codes	More Stringent Building Codes for Residential Buildings	
	National Plans and Goals to Promote Development of Clean Industries	Policies and Goals to Promote Development of Clean Industries	Green Building Codes	More Stringent Local Green Building Codes	
	National R&D Investment Share of GDP	Municipal R&D Investment of Local GDP		Subsidies for New Buildings that Exceed Building Codes	
Energy Supply	National Sustainable Energy Development Plan	Municipal Sustainable Energy Development Plan City Strategic Plan to Develop Renewable and Alternative Energy		Zero Emission Building Pilots; Targets for Efficiency and Renewables in Buildings	Buildings
	National Total Energy Consumption Reduction Targets	City Total Energy Consumption Reduction Targets	Appliance Efficiency Standards and Labeling	Financial Incentives for Energy Efficiency Appliances	
	National Target to Increase Non-Fossil Fuel Share in Primary Energy Consumption to around 20% by 2030	Municipal Targets for Renewables Development		Public Campaigns Promoting an Energy Conservation Life-Style	
	National Goals of Installed Capacity for Wind Power, Solar Power, and Solar Thermal Energy	Renewable Energy Development Pilot Program	Energy Efficiency Improvement Goals for Transportation Sector	Municipal Energy Efficiency Improvement Goals and Action Plans for Transportation Sector	
	National Feed-in Tariff Policies	Financial Incentives for Renewable Energy	Policies and Financial Incentives to Promote Electric Vehicles and Construction of Charging Stations	Policies and Financial Incentives to Promote Alternative Energy Vehicles and Construction of Charging Stations; Municipal Targets for Electric Vehicle Ownership	Transportation
	National Coal Consumption Cap	State and City Coal Consumption Reduction Plan City Coal-Free Zone		Municipal Electric Vehicle Promotion Program	
	Nationwide Minimum Performance Standards for Coal Power Plants	Advanced Clean Coal Pilot Projects	Fuel Economy Standards for Light-duty Vehicles	Tax Credits for Efficient and Low Emission Cars	
	Demand Side Management Guideline	Demand Side Management Program	Targets for Public Transit Share in Motorized Travel in Large- and Medium-sized Cities	Municipal Targets for Public Transit Share in Motorized Travel	
	CCS Piloting Programs	CCS Pilot		Bicycle and Pedestrian Path (Non-Motorized Transportation) Networks	
Carbon Sink and Waste Mangement	Enhance Afforestation	Urban Forestry Management		Public Bicycle System	
		Municipal Program Promoting Afforestation		Integrated Transportation Planning Program	
	Waste Management System	Improve Waste Separation and Recycling System Methane Capture and Conservation for Landfills		Policies to Control Private Vehicle Ownership Growth	
				Policies to Control Motorized Commuting (Parking Fee, Vehicle License Policies)	
				Public Transit City Programs	Transportation
			National Guidelines Promote Low Carbon Green Urbanization, Low Carbon Community Development, etc.	Low Carbon Community Pilots Low Carbon / Eco-City Planning Programs	

City Actions List aims to assemble all policies and actions of all kinds of cities to promote low carbon development. For a specific city, its action often only cover part of the actions based on local needs, and cities may also have innovative actions, which are not included here.



While piloting low-carbon development in 42 pilots, central government agencies are also managing other programs that reinforce energy savings and carbon emission mitigation goals. Some of the pilots overlap geographically. The above table maps APPC member cities and related pilots and how they reinforce each other.

National Pilot Programs Promoting Low Carbon City Development

	Low Carbon Pilots	Sustainable Urbanization Pilots Program	Smart-City Pilots Program	Integrated Energy Conservation and Emission Reduction Cities Pilots Program	Alternative Energy City Pilots Program	Low Carbon Industrial Zone Pilot Program	Renewables in Building Pilots Program	Alternative Fuel Vehicles Pilots Program	Low Carbon Integrated Transportation Planning Pilots Program	Public Transit City Pilots Program	Ecological Civilization Pioneering Example Zones	National Industrial Green Transition Development Cities Pilots
Central Government Agencies	NDRC	NDRC	MoHURD	NDRC MOF	NEA	MIIT	MoHURD	MIIT	MOT	MOT	NDRC	MIIT
Beijing												
Chizhou												
Ganzhou												
Guangyuan												
Guangzhou												
Guilin												
Guiyang												
Jinchang												
Jilin												
Jincheng												
Nanping												
Ningbo												
Qingdao												
Shenzhen												
Suzhou												
Wenzhou												
Ürümqi												
Wuhan												
Yan'an												
Zhenjiang												
Zunyi												

☒ Yes ☐ No

Data Sources: Data was collected from the official websites of the National Development and Reform Commission (NDRC), the Ministry of Housing and Urban-Rural Development (MOHURD), the Ministry of Industry and Information Technology (MIIT), the Ministry of Science and Technology (MOST), the Ministry of Finance (MOF), the Ministry of Transport (MOT), and the National Energy Administration (NEA).

**Beijing:** Located at the northern tip of the North China Plain; China's capital and second largest city; a directly-controlled municipality under the national government; China's political, economic and cultural center. In 2015, GDP: 2,296.86 billion yuan; GDP growth rate: 7%; per capita GDP: 106,284 yuan; tertiary industry as share of total: 78%; urbanization rate: 86.5%; lack of energy resources; energy consumption in 2015: 74.545 million tons of coal equivalent.

**Chizhou:** Key riverside port city on the southern bank of the Yangtze River; located at the urban agglomeration of the Yangtze River Delta; a mature national resource-based city; a core energy resource area for China. In 2015, local GDP: 55 billion yuan; GDP growth rate: 9%; per capita GDP: 35,320 yuan; tertiary industry as share of total: 40.70%; urbanization rate: 51.11%; coal energy consumption by industrial enterprises above state designated scale makes up over 80% of energy consumption; energy consumption of five major energy-intensive industries in the city is 95% of industrial enterprises above state designated scale.

**Ganzhou:** Located in southern Jiangxi province; a mature national resource-based city; a core energy resource area. In 2015, local GDP: 19.7387 billion yuan; GDP growth rate: 10%; per capita GDP: 23,148 yuan; tertiary industry as share of total: 39%; urbanization rate: 45.51%. Building materials and nonferrous metal metallurgy are the main industries, and coal plays an important role in the energy mix. Important nonferrous metals metallurgy base.

**Guangyuan:** Located in northern Sichuan province; a mature resource-based city; a core energy resource area. In 2015, local GDP: 60.543 billion yuan; GDP growth rate: 19%; per capita GDP: 23,020.15 yuan; tertiary industry as share of total: 36.3%; urbanization rate: 40.83%. One of seven major coal-manufacturing cities or regions in Sichuan; important supply base for electricity and coal. Fossil fuels, such as coal and oil, dominates the energy mix.

**Guangzhou:** Located in southern China; capital of Guangdong province; third largest city in China. In 2015, GDP: 1.84 trillion yuan; GDP growth rate: 8%; per capita GDP: 134,066 yuan; tertiary industry as share of total: 67%; urbanization rate: 85.53%; all primary energy supply (coal, oil) is imported from outside city; energy consumption in 2015 was 56.88 million tons of coal equivalent.

**Guiyang:** Located east of the Yunnan-Guizhou Plateau in southwestern China; capital of Guizhou province. In 2015, GDP: 389.1 billion yuan; GDP growth rate: 13%; per capita GDP: 63,003 yuan; tertiary industry as share of total: 57.60%; urbanization rate: 75%; forest area (% of land area) ranks among the top in China; Coal-dominated energy mix, coal consumption accounts for over 65% of the total; energy consumption of six energy-intensive industries was over 70% of the energy consumed by large scale industries.

**Guilin:** Located in northeastern Guangxi Zhuang Autonomous Region; famous scenic tourist city; a world historical and cultural city. In 2015, local GDP: 19.43 million yuan; GDP growth rate: 8%; per capita GDP: 39,374 yuan; tertiary industry as share of total: 36%; urbanization rate: 46.70%. Fossil fuel (mostly coal)-dominated energy mix. In 2015, 8.89 million tons of coal equivalent was consumed.

**Jinchang:** Located east of the Hexi Corridor in Gansu province; a small city. In 2015, GDP: 22.45 billion yuan; GDP growth rate: 3%; per capita GDP: 52,336 yuan; tertiary industry as share of total: 34%; urbanization rate: 67.90%; Coal-dominated energy mix, coal takes up the bulk of industrial energy consumption.

**Jilin:** Located in northeastern China; second largest city in Jilin province; a traditional northeast industrial base and typical resource-based city; In 2015, GDP: 24.55 billion yuan; GDP growth rate: 6.4%; per capita GDP: 57,506.1 yuan; tertiary industry as share of total: 44.2%; urbanization rate: 58.50%; rich in shale oil, conventional oil, and coal; forest area (% of land area): 55%; energy consumption of six energy-intensive industries accounts for over 80% of the energy consumed by all large-scale industries.

**Jincheng:** Located in southeastern Shanxi province; a typical mining resource-based city; a core energy resource area. In 2015, local GDP: 10.402 billion yuan; GDP growth rate: 3%; per capita GDP: 44,933 yuan; tertiary industry as share of total: 40%; urbanization rate: 57.42%. A key manufacturing base of anthracite coal. Coal and coal bed methane mining, metallurgy, the chemical industry and thermal power generation make up the bulk of its industrial structure. The secondary industry dominates energy consumption. Industrial energy consumption is about 80% of municipal consumption.

**Nanping:** Located in northern Fujian province; a traditional industrial and mature resource-based city; a core energy resource area. In 2015, local GDP: 13.395 billion yuan; GDP growth rate: 9%; per capita GDP: 51,100 yuan; tertiary industry as share of total: 35.2%; urbanization rate: 53.40%. Few conventional resources except for hydropower. Energy consumptions mainly come from outside.

**Ningbo:** Sub-provincial city; designated in state plan. In 2015, local GDP: 80.115 billion yuan; GDP growth rate: 8%; per capita GDP: 102,500 yuan; tertiary industry as share of total: 47.4%; urbanization rate: 71.10%. Lack of primary energy resources; a typical resource-consuming city.

**Qingdao:** Located in southwestern Shandong province; a sub-provincial city; designated in state plan. In 2015, GDP: 9300.07 billion yuan; GDP growth rate: 8%; per capita GDP: 102,519 yuan; tertiary industry as share of total: 52.80%; urbanization rate: 70%. All primary energy is imported.

**Shenzhen:** Located to the east of the Pearl River Delta; China's first special economic zone; a sub-provincial city; designated in state plan. In 2015, local GDP: 1.75 trillion yuan; GDP growth rate: 8%; per capita GDP: 149,497 yuan; tertiary industry as share of total: 58.80%; urbanization rate: 100%. Energy-defaulting city, most resources imported from outside.

**Suzhou:** Located in southeastern Jiangsu province; an important central city in the Yangtze River Delta; a national industrial major city. In 2015, local GDP: 1.45 trillion yuan; GDP growth rate: 8%; per capita GDP: 136,300 yuan; tertiary industry as share of total: 46.70%; urbanization rate: 75%. Little renewable energy, coal-dominated energy mix.

**Wenzhou:** Located in southeastern Zhejiang province. In 2015, local GDP: 46.198 billion yuan; GDP growth rate: 8%; per capita GDP: 50,809 yuan; tertiary industry as share of total: 51.80%; urbanization rate: 68%. Fossil fuel - such as coal and oil - are key energy sources.

**Urumqi:** Xinjiang Uygur Autonomous Region capital; an important city in China's western area. In 2015, local GDP: 268 billion yuan; GDP growth rate: 11%; per capita GDP: 49,351 yuan; tertiary industry as share of total: 62.66%; urbanization rate: 72.90%. Coal, oil, and gas are main energy sources. Abundant clean and renewable energy such as solar and wind.

**Wuhan:** Hubei provincial capital; the largest central city and the only city with sub-provincial status in Central China; a megacity on the middle and lower reaches of the Yangtze River; In 2015, GDP: 1.0906 trillion yuan; GDP growth rate: 9%; per capita GDP: 102,800 yuan; tertiary industry as share of total: 52%; urbanization rate: 79.41%. An important industrial base and transportation hub; short of energy resources; coal, oil and natural gas supply is all from outside city; high energy transmission dependency.

**Yan'an:** Located south of the Shanbei region in Shaanxi province on the middle reaches of the Yellow River. In 2015, GDP: 119.9 billion yuan; GDP growth rate: 2%; per capita GDP: 53,925 yuan (10,214 USD); tertiary industry as share of total: 28.80%; urbanization rate: 57.30%. Typical energy-based city in Shanxi province; rich in mineral resources (coal, oil and natural gas); energy plays an important role in its economic growth.

**Zhenjiang:** Located in southwestern Jiangsu province, on the southern bank of the Yangtze River at the tip of the Yangtze River Delta. In 2015, GDP: 350 billion yuan; GDP growth rate: 10%; per capita GDP: 110,351 yuan; tertiary industry as share of total: 46.90%; urbanization rate: 67.90%. Short of energy resources; all primary energy supply (coal, oil) relies on import from outside city.

**Zunyi:** Located in northern Guizhou province. In 2015, local GDP: 216.83 billion yuan; GDP growth rate: 13%; per capita GDP: 35,229 yuan; tertiary industry as share of total: 42.80%; urbanization rate: 46.70%. An important energy base for the national project to transfer electricity from west to east. Abundant energy resources with the advantage of both hydropower and coal.

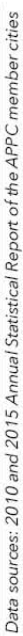
Data sources: 2015 Annual Statistical Report of the above cities. 2015 Statistical yearbooks of the above cities.

## APPC Members Action Factsheet

By comparing these 38 actions, a learning-by-doing process is encouraged to promote China's low-carbon city development.

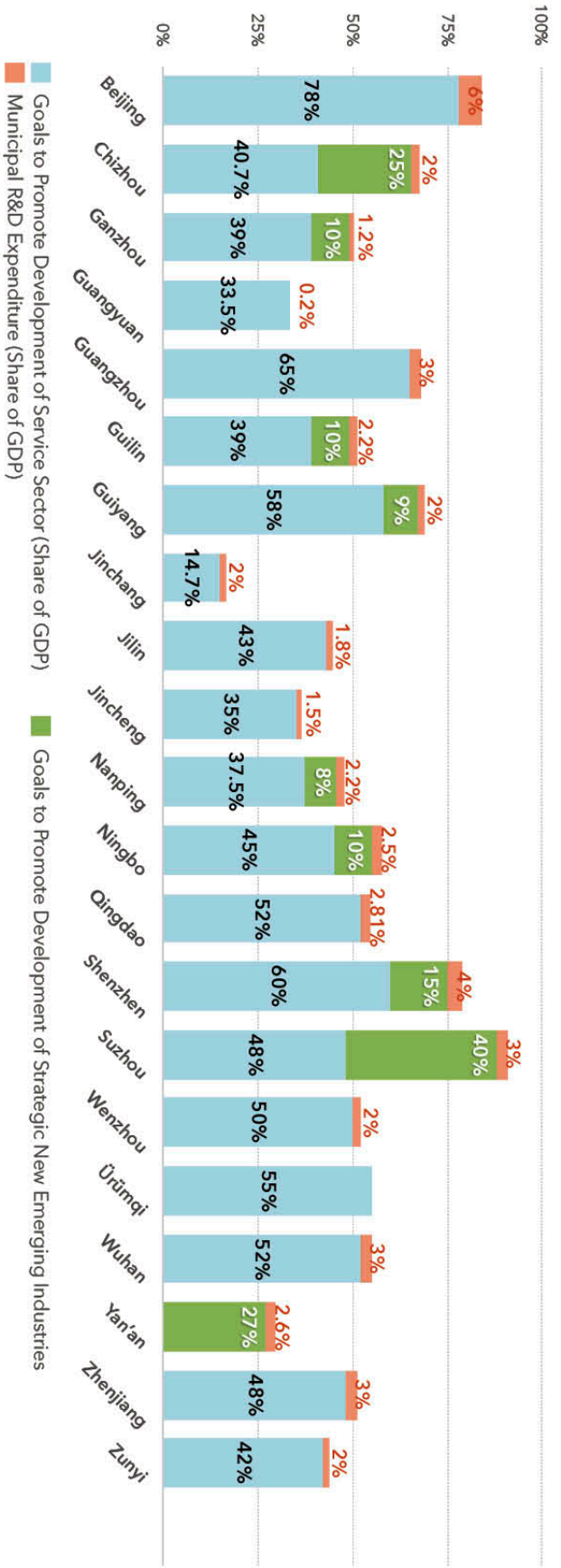


The new normal of China's economic growth provides opportunities and challenges to China's low-carbon development. In 2015, the GDP growth rates of APCC member slowed, although both urbanization and service industries continued to expand.

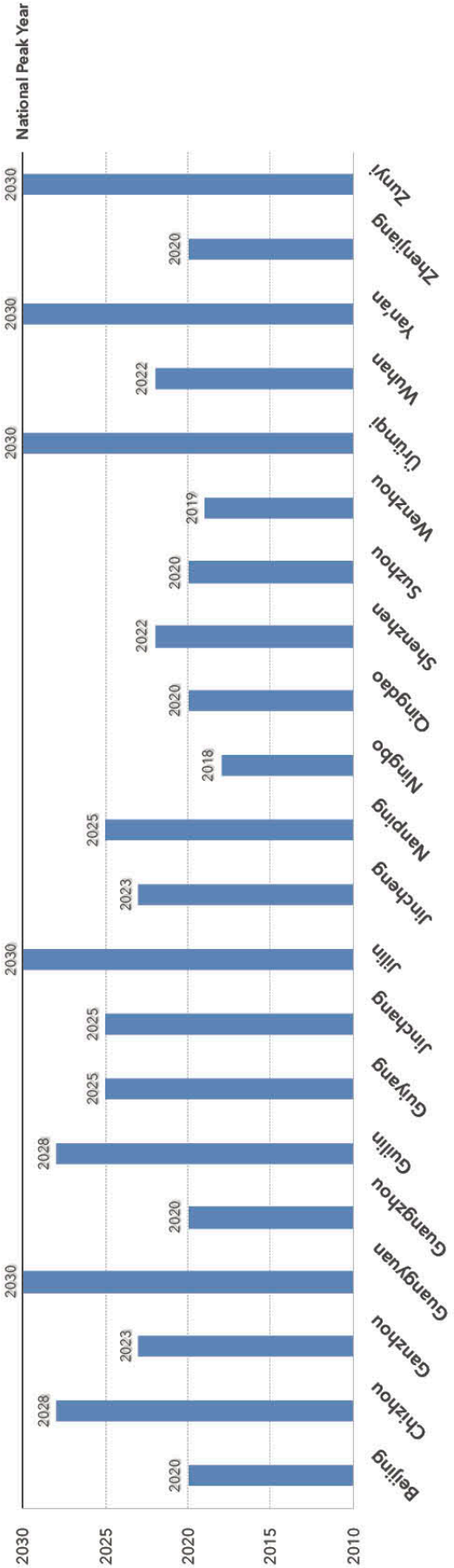




Decarbonizing the Economy



Peak Years for Carbon Dioxide Emissions



APPC members have all set out their target year to peak carbon emissions: Ningbo, Wenzhou, Beijing, Guangzhou, Qingdao and Zhenjiang have targeted around 2020, 10 years earlier than the national target of 2030. Shenzhen and Wuhan have targeted 2022; Ganzhou and Jincheng, 2023; Guiyang, Jilin, Nanping and Jinchang, 2025. APPC members have pledged to take more effective actions to promote exchanges and cooperation domestically and internationally, optimize their economic structure, promote the transformation and upgrading of industrial structure, push forward on developing clean energy, smart grids, low-carbon transportation, energy-saving and new-energy cars, green buildings, low-carbon industrial parks and low-carbon communities, and build and improve market mechanisms that encourage the reduction of carbon emissions, and promote low-carbon technologies and applications.



Climate Actions	Beijing	Chizhou	Ganzhou	Guangyuan	Guangzhou	Guilin	Guiyang	Jinchang	Jilin	Jincheng	Nanping
Municipal Low Carbon Development/ Climate Change Plans	—					—			—		—
Low-Carbon Pilot Development Guidelines											
GHG Emissions Inventory Development											
GHG Reporting and Registry	—	—		—							
Carbon Emissions Impact Assessment Requirement	—	—	—	—	—	—	—	—	—		—
Carbon Market	—	—		—		—	—		—	—	—
Industry	Beijing	Chizhou	Ganzhou	Guangyuan	Guangzhou	Guilin	Guiyang	Jinchang	Jilin	Jincheng	Nanping
2015 Target to reduce Energy Consumption per unit of Industry Value-Added, from 2010 Levels	21%	20%	30%	20%	20%	17%	25%	16%	19%	18%	16%
Industry Structural Change Guidelines	—				—				—		
Top-10,000 Program Implementation Incentive Policies											
Energy Supply	Beijing	Chizhou	Ganzhou	Guangyuan	Guangzhou	Guilin	Guiyang	Jinchang	Jilin	Jincheng	Nanping
2015 Target to increase Non-Fossil Fuel Share in Primary Energy Consumption	6%	6.5%	11.41%	18%	3%	25%	9.8%	8.4%	11.4%	3%	20%
Municipal Strategic Plan to Develop Renewables and Alternative Energy		—						—	—	—	—
Total Energy Consumption Control Targets											
Policies on Coal Consumption											
Total Coal Consumption Reduction Targets			—				—	—		—	
Buildings	Beijing	Chizhou	Ganzhou	Guangyuan	Guangzhou	Guilin	Guiyang	Jinchang	Jilin	Jincheng	Nanping
Local Building Codes for Residential Buildings	75%	50%	50%	50%	65%	50%	50%	50%	65%	65%	50%
Green Buildings in New Residential Buildings	100%	20%	20%	100%	30%	20%	20%	20%	100%	15%	20%
Municipal Energy Efficiency Improvement Target and Guidelines for the Building										—	
Local Green Building Codes		—	—	—				—	—	—	—
Transportation and Urban Forms	Beijing	Chizhou	Ganzhou	Guangyuan	Guangzhou	Guilin	Guiyang	Jinchang	Jilin	Jincheng	Nanping
Targets for Public Transit Share in Motorised Travel	50%			15%	40%	20.08%	30%	25%	35%	30%	
Targets for Alternative Energy Vehicles		—		—		—		—	—		
Policies and Financial Incentives to Promote Electric Vehicles, and Construction of Charging		—		—		—		—	—		
Carbon Sinks and Waste Management	Beijing	Chizhou	Ganzhou	Guangyuan	Guangzhou	Guilin	Guiyang	Jinchang	Jilin	Jincheng	Nanping
Forest Coverage Rate	41.6%	59.2%	76.2%	55.3%	42.0%	70.9%	45.5%	24.3%	56.2%	44.0%	76.5%
Waste Management											

Ningbo	Qingdao	Shenzhen	Suzhou	Wenzhou	Ürümqi	Wuhan	Yan'an	Zhenjiang	Zunyi	Climate Actions
—					—	—				Municipal Low Carbon Development/ Climate Change Plans
										Low-Carbon Pilot Development Guidelines
										GHG Emissions Inventory Development
		—					—		—	GHG Reporting and Registry
—	—	—	—	—	—		—		—	Carbon Emissions Impact Assessment Requirement
—				—	—		—	—	—	Carbon Market
Ningbo	Qingdao	Shenzhen	Suzhou	Wenzhou	Ürümqi	Wuhan	Yan'an	Zhenjiang	Zunyi	Industry
15%	18%	20%	21%	10.4%	15%			20%	16%	2015 Target to reduce Energy Consumption per unit of Industry Value-Added, from 2010 Levels
				—	—	—	—			Industry Structural Change Guidelines
										Top-10,000 Program Implementation Incentive Policies
Ningbo	Qingdao	Shenzhen	Suzhou	Wenzhou	Ürümqi	Wuhan	Yan'an	Zhenjiang	Zunyi	Energy Supply
2.10%	2.00%	18.00%	0.50%	1.83%	2.00%	10.30%	10.10%	4.30%		2015 Target to increase Non-Fossil Fuel Share in Primary Energy Consumption
—	—	—	—			—	—	—	—	Municipal Strategic Plan to Develop Renewables and Alternative Energy
										Total Energy Consumption Control Targets
										Policies on Coal Consumption
								—		Total Coal Consumption Reduction Targets
Ningbo	Qingdao	Shenzhen	Suzhou	Wenzhou	Ürümqi	Wuhan	Yan'an	Zhenjiang	Zunyi	Buildings
50%	65%	65%	65%	50%	75%	65%	50%	65%	50%	Local Building Codes for Residential Buildings
		100%	100%					100%		Green Buildings in New Residential Buildings
20%	25%			20%	20%	20%	20%		20%	Municipal Energy Efficiency Improvement Target and Guidelines for the Building
	—		—	—	—	—	—	—	—	Local Green Building Codes
Ningbo	Qingdao	Shenzhen	Suzhou	Wenzhou	Ürümqi	Wuhan	Yan'an	Zhenjiang	Zunyi	Transportation and Urban Forms
30%	40%		30%	30%			30%	26%		Targets for Public Transit Share in Motorised Travel
				—			—	—	—	Targets for Alternative Energy Vehicles
				—			—		—	Policies and Financial Incentives to Promote Electric Vehicles, and Construction of Charging
Ningbo	Qingdao	Shenzhen	Suzhou	Wenzhou	Ürümqi	Wuhan	Yan'an	Zhenjiang	Zunyi	Carbon Sinks and Waste Management
48.8%	40.0%	41.5%	29.4%	60.0%	14.8%	28.0%	45.4%	26.8%	55.0%	Forest Coverage Rate
										Waste Management

All data is 2015 data, — represents relevant information is not found  
The information above is compiled based on publicly available data sources.

U.S. and China Comparison of Policies and Practices for Low-Carbon and Climate Smart Cities

Data sources: Hørne, E.et.al. (2014); World Bank; Website; Lynn Price(2012); the U.S. Department of State(2015).

Climate Goals and Actions		China	U.S.	Energy Supply		China	U.S.
Emission Targets	Carbon Emissions per Capita in 2011 (t)	6.7	17	Electricity Generation Per Capita in 2014 (kWh)		4,015	12,836
	CO <sub>2</sub> Emissions Peaking Year Goal	●	NA	Share of electricity generated from coal resources in 2012 (% of total)		75.9%	38.5%
	Total GHG Emissions Cap	NA	●	Standard Coal Equivalent per kWh in 2012(gce/kWh)		326	359
	Target for Reducing CO <sub>2</sub> Emissions per Unit of GDP	●	●	Net coal consumption per unit of electric power output in 2011 (gco2 /kWh)		596	461
	Target for Emissions per Capita		●	Sector Goals		●	●
Climate Action Plans	National Plans	●	●	CO <sub>2</sub> Emission Standards for Electricity Generation			●
	Provincial / State and Municipal	●	●	Emission Performance Standard for New Thermal Power Plants		●	●
GHG Reporting System	Threshold	≥13,000 tCO <sub>2</sub> e	≥25,000 tCO <sub>2</sub> e	Coal Efficiency Performance Standards		●	
	Frequency	1	4	CO <sub>2</sub> Emission Standards			●
Carbon Market		China	U.S.	Renewable Energy Development Goals		●	●
National Carbon Market		In Progress		Target for Non-Fossil Fuel Share		●	●
Regional / Local Carbon Markets		●	●	Clean power supply		●	●
		China plans to launch the national carbon market in the year of 2017. China now has 7 carbon market pilots, while the U.S. has 1 regional and 1 state carbon market.		Renewable Electricity Price Subsidies		●	
				Grid access and Priority dispatch for renewable energy		●	
				Community Green Power Purchase			●
				Development and Use of Combined Heat and Power		●	●
				Research & Development for Carbon Capture and Storage		●	●
				Smart Grid		●	●
				Smart Grid Demonstration Projects and Investment		●	●

**China 2005, CO<sub>2</sub> Emissions Per Unit of GDP: 3.1 t CO<sub>2</sub> /RMB 10,000**

▼ 40%–50% 2020

▼ 60%–65% 2030

Peaking Year of CO<sub>2</sub> Emissions

**U.S.2005 GHG emissions: 7253.8 million tons CO<sub>2</sub> Eq.**

▼ 17% 2020

▼ 26%–28% 2025

▼ 42% 2030

▼ 83% 2050

China's goals mainly refer to energy related CO<sub>2</sub> emissions, while the U.S. goal covers all GHGs. Some Chinese cities have set targets to peak their GHG emissions by certain years. Emissions from most U.S. cities have started declining; therefore, their emission targets are absolute reduction targets from a baseline year. Some cities also have targets for emissions per capita.

**Goal of Increasing the Percentage of Renewable Energy**

Guangdong 20% 2015

California 33% 2020

40% 2024

45% 2027

50% 2030

**Goal for CO<sub>2</sub> Emission Standards Performance Standards for New Fossil Fuel Power**

U.S.: 635g CO<sub>2</sub> per kWh

China: 650g CO<sub>2</sub> per kWh

**Timeline:**

2009 U.S. Regional Greenhouse Gas Initiative (RGGI)

2011 China Seven Provinces and Cities Launched Carbon Emissions Trading Pilots

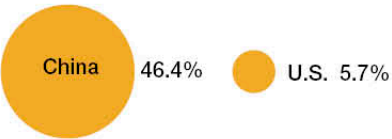
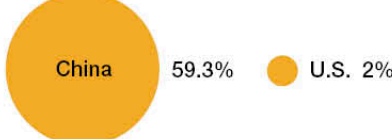
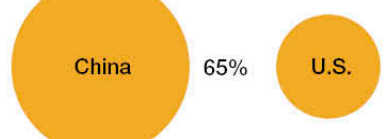


















2017 China National Carbon Emissions Trading Market

U.S. California Launched Carbon Emissions Trading System

● Yes    □ No    NA: Not Applicable



U.S. and China Comparison of Policies and Practices for Low-Carbon and Climate Smart Cities

Industry		China	U.S.	Transportation		China	U.S.
Crude Steel production Share of the world (% total) in 2012		Cement Production Share of the world (% total) in 2013		Share of CO2 Emission from Fossil Fuel Combustion in 2011			
							
Primary Energy Intensity for Crude Steel in 2006(GJ/t of Product)		26.3	19.98	<p>China's Top-10,000 Program is mandatory and targets the largest energy consuming industrial plants. On the other hand, the U.S. Better Plants Program is a voluntary incentive program for all manufacturing facilities. Overall, China's industrial energy efficiency policies are more rigid than those in the U.S.</p>			
Energy Efficiency Standards for Industrial Equipment s and Products		Mandatory Standards for 79 Products; Voluntary standards for more than 290	30% of industrial usage				
Energy Conservation Program for Industrial Plants							
Buildings		China	U.S.				
Floor Space Per Inhabitant in 2011 (m²/capita)		Energy Use for Heating, Cooling and Appliances 2010 (kWh/m²)					
China  31.6 U.S.  80		China  94 U.S.  357					
Building Codes for New Buildings				<p>The U.S. and China have similar building code systems with similar levels of stringency. In China, the national government sets up building codes. Meanwhile, local governments can have their own more stringent standards.</p>			
 Public Buildings/Commercial							
 Residential Buildings							
Targets for Renewables in Buildings				<p>In the U.S., state governments set up building codes. The U.S. is more stringent on appliance efficiency standards. However, energy use per square meter is much higher in the U.S. than in China, due to wider use of appliances, and more importantly, difference in lifestyle.</p>			
Building Retrofitting Programs							
Appliance Efficiency Standards and Labeling							

● Yes □ No NA: Not Aplicable

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iGDP is currently focused on the following areas:

- Low-Carbon Sector Policy
- Low-Carbon Development Planning
- Energy System Analysis
- Carbon Emissions Trading
- Green Financing, Taxes and Investment
- International Cooperation on Climate Change

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#### About iGDP Policy Mapping

iGDP Policy Mapping is a database and interactive platform to track, synthesize and compare low-carbon development policies and actions across regions and cities in China. By identifying publicly-available key policies and performance indicators on low-carbon development, the iGDP Policy Mapping will promote best practices and learning-by-doing. iGDP Policy Mapping will also issue a series of Policy Progress Factsheets and Regional Low-carbon Development Performance Reports regularly.

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