Subnational Decarbonization and Sustainable Urbanization in China

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Contents

Overview Policy framework in China

01

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Key findings From LOGIC and EPS

02



2

01

Overview of Climate and Energy Policy Framework in China



Climate change has posed more and more tangible impact on urban daily life

- **Rising public awareness to climate change in urban areas** More natural disasters in urban areas
 - Flood
 - Extreme heat
 - Wild fires in mountainous regions, etc.
- Consensus: decarbonization is one of the priorities in sustainable urbanization





Extreme precipitation spatial distribution







Extreme precipitation in Zhengzhou, 2021

Figures are from YIN Hong, SUN Ying. Characteristics of extreme temperature and precipitation in China in 2017 based on ETCCDI indices. Advances in Climate Change Research[J], 2019, 15(4): 363-373 doi:10.12006/j.issn.1673-1719.2018.164

Wild fire in Chongqing, 2023

Figure sources: WeChat articles,冯丁伊登, 上游新闻

Environment and Climate Policy Framework

for nation and subnational regions

DRIVERS OF CHINA'S CLIMATE POLICY

Aligning with the Development Strategy



Resources-intensive growth to High-quality growth New growth engine: clean technologies

Air Quality Improvement Conservation Forestation

GLOBAL LEADERSHIP

ECO-

CIVILIZATION

Geopolitical Competition Common Ground for multilateral/bilateral dialogues



Outcomes from climate and environment policy actions, on top of **slowed-down climate change**, are **aligned with the goal of sustainability and resilience** of urbanization:

- Sustainable environment: Less fossil fuel consumption, less pollutions.
 Forestation and ecological protection, etc.
- **Sustainable economy**: Development of emerging industries, transition away from carbon intensive industries, etc.

"1": 2030 Early Peaking Action Plan of the State Council "N" refers to multiple sectoral plans in the area of Energy, Industry, Urbanization, Transportation, Agriculture; supported by corresponding plans in technology, finance, carbon sink, etc.

Findings



Scale and Diversity

Emission level and transition pathways are very diverse. Most of rich regions' emission have seen decoupling from economic growth.





The provincial regions in this brief refer to provincial administrative regions (PAR), including 23 provinces, 4 municipalities, 5 autonomous re special administrative regions. The data collection in this report does not include Tibet, Taiwan, Hong Kong and Macao, though they are also *Energy-related CO2 emission in 2020 calculated by iGDP, GDP from National Bureau of Statistics, U.S. and OECD data from World Bank Income groups are based on the World Bank's classifications in 2020

Tracking Low-Carbon Transition Progress in Subnational Regions

LOGIC (Low-carbon & Green Index for Cities) Framework

Figure 7 - The Framework for the LOGIC Tool and Analysis



LOGIC Indicators System (2024) 19 qualitative indicators, 4 qualitative indicators 10+ monitoring indicators

_	Carbon productivity - 2 indicators	
-	Carbon Emissions - 11 indicators	
	Energy	
	Industry	
	Transportation	
	Buildings	
—	Environment & Land use - 6 indicators	
(Social Awareness - 4 indicators	



LOGIC Score (2015 vs 2021) by region

Environment and Climate Policies Accelerated Low-Carbon Transition Progress based on LOGIC score

Jilin		+22.3%
Shanghai		+21.0%
Chongqing		+17.1%
Shaanxi		+15.3%
Beijing		+15.0%
Sichuan		+12.9%
Tianjin		+12.5%
Henan		+12.3%
Xinjiang		+11.9%
Liaoning		+11.6%
Hebei		+11.3%
Heilongjiang		+10.9%
Zhejiang		+10.3%
Anhui		+10.2%
Guizhou		+9.6%
Guangdong		+9.3%
Shandong		+8.5%
Hainan		+8.1%
Shanxi		+8.0%
Hubei		+7.9%
Jiangxi		+7.4%
Fujian		+7.2%
Jiangsu		+6.8%
Hunan		+5.9%
Gansu		+5.7%
Qinghai		+5.5%
Neimenggu		+4.6%
Ningxia	□ Year 2015	+3.7%
Yunnan	Ver 2021	-4.4%
Guangxi		-6.3%

Progress: Between 2015 and 2021, the average score of the Provincial LOGIC Index increased 9.2% from 21.7 to 23.7.

Olau ifia and		Jilin		+24.2%
Significant	Fast-developing or	Beijing		+20.0%
	actobing up regione	Shanghai		+14.2%
Improvement i	n catching-up regions.	Guizhou		+9.9%
	••	Xinjiang		+9.7%
Environment a	nd	Qingnal		+9.4%
	iiu	Ningxia		+8.5%
Land Llag		Hubei		+ 0.076
Lanu Use		lianovi		+ 5.070
		Guanadona		+5.2%
_		Zhejiang		+4.8%
AL	L regions can make evident	Shaanxi		+4.5%
pro	paress with appropriate measures.	Shandong		+4.1%
de	spite of economic development	Tianjin		+3.5%
	otuc onoray structure etc	Neimenggu		+3.2%
516	alus, energy structure etc.	Fujian		+3.0%
		Chongqing		+1.4%
		Shanxi		+0.9%
		Heilongjiang		+0.4%
		Jiangsu		+0.4%
		Anhui		+0.2%
		Hainan	□ Year 2015	+0.1%
		Henan		-1.0%
		Sichuan	■ Year 2021	- 1.0 %
		Gansu		-2.0%
		Vunnan		-13.7%
		Guanovi		-14.3%
		Hunan		-20.5%

旧iGDP

Subsector LOGIC Score: Environment and Land Use (2015 vs 2021) by region

Most Effective Policies Using Energy Policy Simulator (EPS)

Top 10 Provinces by GHG abatement (2021-2060)

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Captured in local policies and measures.

Shandong							Hebei					Neimer	nggu					ŀ	Henan	Industrial Electrificatior	n (Build	ling onent
	Inc	luctrial		Floctr	city												Buildir	g		and Hydrogei 14%	n: E	lectrif 119	icat %
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	Measur Build	res: 8% ding	Buildi	. Mate	e 2	ZEV	Flectricity	Building	5% Hydrog	Re	e 3%	Zhejian	g		Anh	ui			Shanxi			Buildi	ing
Clean Electricity Standard: 32%	Comp Electrifi 75	onent ication: %	Energy Efficie Stand	effic Long Re.	i S j S	ales ta 3%	Imports and Exports: 13%	Electrifi 10%	Electrol 4%	ZE Sal	V Bu En	Electricity I	mport	s and	- · · ·					Industrial Electrification and Hydrogen	C : F	ompor gas	nen In
Guangdong							Jiangsu					LAPON	.3. 2070	5	Impo anc	orts d	Clea Electri	n citv	Clean		M	ea	CC
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		Electrification and Measures: Hydrogen: 13% 10%			and Hydroge 17%		ydrogen: Imports and 7% Exports: 13%		Clean Electricity Standard: 21%		and ty Hydro Inc % 12% Elect		lustrial rificatio	rial Mater ation Efficie		Liaoning	1370	Electr	i	V ZEV			
		Electric	ity	Material Efficiency,	ZEV	Sales			ZEV S Stand	Sales lard:	Industry Energy		Indu. CCS	Indu : Ener	and H	lydroge 15%	en: Loi Re	nge -Us		Clean Electricity	anc Expor	rts S S t	tan 8%
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Clean Electricity Star	ndard:	Buildin	lg	Energy Efficie	Ve Fuel	B E	Clean Electricity	F-gas / Meas	Co Ele. <u></u>	In C	Efficie	11%	ZEV S	Buildi	F-gas Me. <u></u>	ZEV	In	dus	and Hydroge <u>n:</u>	Building Compone <u>nt</u>	Heat.	Ну	ydr
45%		Electrificatio	on: 6%	3%	Ec	E	Standard: 36%	10%	4%	4%	N2O	Material	St	Buildi	8%	Sales.	Sh	ift	30%	Electrificati	F-gas	In	dus

Note: Sorted using cumulative GHG emission reduction to identify top 10 policies in each of the top 10 provinces (which contribute to 28% of the total abatement). Preliminary results, please do not cite without author's permission.

Top 10 Policies by GHG Abatement (2026-2060)

(Dual Carbon Scenario vs 2020 Frozen Policy)

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In line with urbanization sustainability efforts.

		Building Component	F-gas Measu	res, 7%	ZEV Sales Standard, 4%
		Electrification, 9%			
			Material	Industry CCS, 3%	Industry Energy Efficiency Standards, 3%
	loductrial Flactrification and	Flactuicity (know outpaced	Efficiency,		
Clean Electricity Standard, 26%	Hydrogen, 17%	Electricity imports and Exports, 8%	Re-Use, 4%	Produc	ts, 3%
Note: Sorted using	cumulative GHG emission reduction to ider	tify top 10 policies (which contribute to 859	% of the total abater	nent).	

Preliminary results, please do not cite without author's permission.

Institute for Global Decarbonization Progress



The Institute for Global Decarbonization Progress (iGDP) is a non-profit think tank focusing on green and low-carbon development with offices in China and Europe. Established in Beijing in 2014, iGDP is dedicated to supporting China's green and low-carbon practices, contributing to the global effort to address climate change, and providing decision-makers, investors and local communities with forward-thinking solutions.



national EPS	Mode	IS	EPS China M	odel	Non-CO2 and Agri-food	
中国分省气候政	策模型		中国能源	政策评估模型	非二与农食	
			Control Designer Service			
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Thank you!

