
China Carbon Neutrality Tracker

2022 Annual Report

Report Summary

China's 'dual carbon' goals have entered their third year. To deliver on its ambitious climate goals, China has established an '1+N' policy framework within which China's provincial regions are tasked with designing and implementing climate strategies¹. To a significant degree, meeting the dual carbon goals will depend on China's provinces implementing robust climate policy actions.

The low carbon actions being taken by China's provincial regions vary due to the vast differences in their levels of economic development, energy supply structures, industrial structures and resource endowments. Tracking all these actions is necessary to have an accurate picture of the changes on the ground that are driving progress toward China's national climate goals.

Drawing on iGDP's China Carbon Neutrality Tracker (CCNT), which tracks China's low carbon policy actions at all levels (national, provincial, municipal), the 2022 CCNT Annual report provides insight into carbon emission trends, climate action planning, and policy implementation in China's provincial regions. The report incorporates case studies to assess the adequacy of existing local policies to support the dual carbon goals, and makes recommendations to strengthen local climate action.

This [report summary](#) highlights the key findings of CCNT's first annual report. For the full report, please click [here](#) or visit the [iGDP website](#).

For more information about the report and its findings, please contact Program Director/Senior Analyst Chen Meian chenmeian@igdp.cn or Strategic Communications Director Yao Zhe yaozhe@igdp.cn.

¹ "Provincial regions" in the CCNT Annual Report refers to provincial administrative regions, including 23 provinces, 4 municipalities, 5 autonomous regions and 2 special administrative regions. The data collection in the report does not include Tibet, Taiwan, Hong Kong and Macao, though they are also provincial administrative regions.

Action Progress

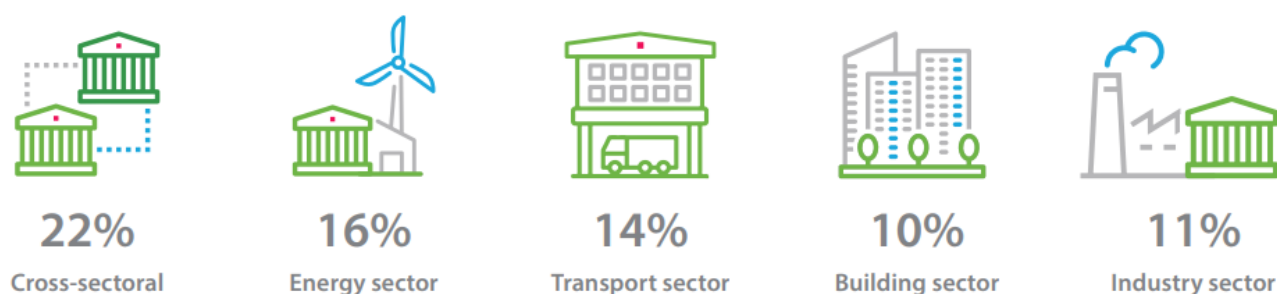
1. One-third of China's provincial regions have already achieved decoupling of carbon emissions and GDP growth.

The vast majority of China's provincial regions have seen a continued decline in carbon emissions intensity, with a reduction in the dependence of economic growth on carbon emissions. One-third of China's provincial regions have seen clear decoupling of carbon emissions and GDP growth. That is, total economic growth has been achieved while total carbon emissions have remained stable or even decreased.

2. Local dual carbon policy deployment is underway, covering key areas such as energy, industry, transportation and buildings.

As of December 2022, CCNT has collected 449 provincial climate action plans. Of these, 22% are cross-sectoral policies (including carbon markets, economic incentives, data platforms, capacity building and so on), 16% are about the transition to green and low carbon energy, 14% are about green and low carbon transport, 11% are about industrial energy conservation and carbon reduction, and 10% are about green and low carbon buildings.

FIGURE 2. Provincial climate plans by sector



Source: CCNT

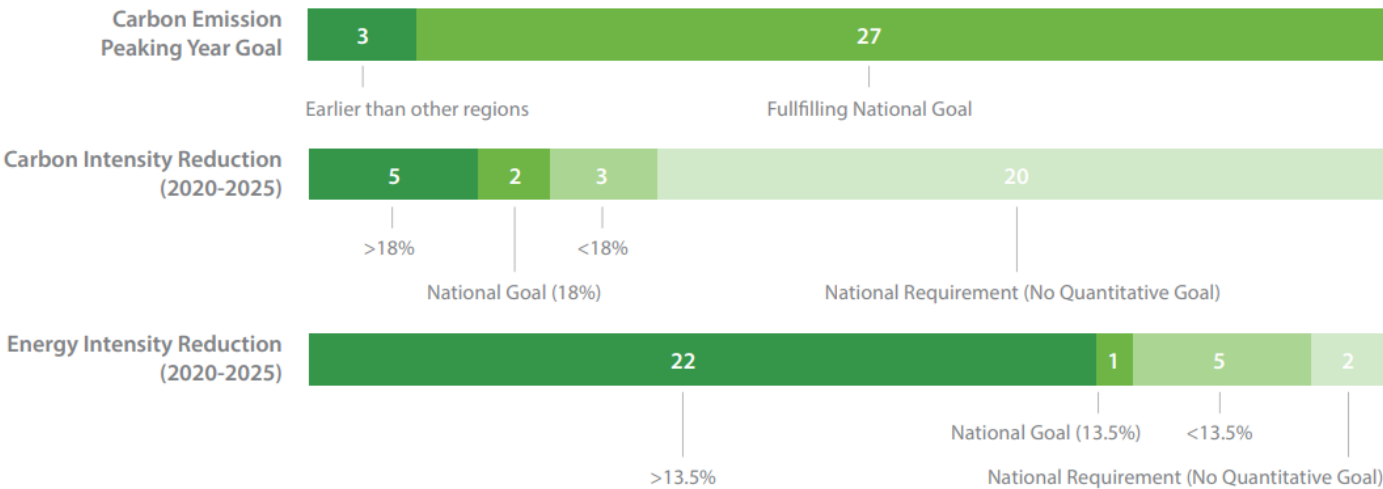
Progress and Ambition in Local Dual Carbon Policymaking

During the 13th Five Year Plan period (2016-2020), most provincial regions achieved their targets for reducing the intensity of carbon emissions and energy consumption. Out of the thirty-four provincial regions assessed in the CCNT annual report, twenty-one exceeded their carbon emission intensity reduction targets. Twenty-three exceeded their national energy consumption intensity reduction targets, but two failed to meet their targets.

During the 14th Five Year Plan period (2021-2025), thirty provincial regions have committed to achieve carbon peaking by 2030, and some have proposed peaking goals earlier than the national target year; most provincial regions have proposed targets for carbon intensity reduction; twenty-two provincial regions have set targets for energy intensity reduction above the national level.

However, several provincial regions have not yet published specific quantitative targets. In addition, as the central government does not set specific requirements for local governments to develop carbon neutrality roadmaps, no provincial regions have developed such plans.

FIGURE 1. Overarching climate goals by provincial region

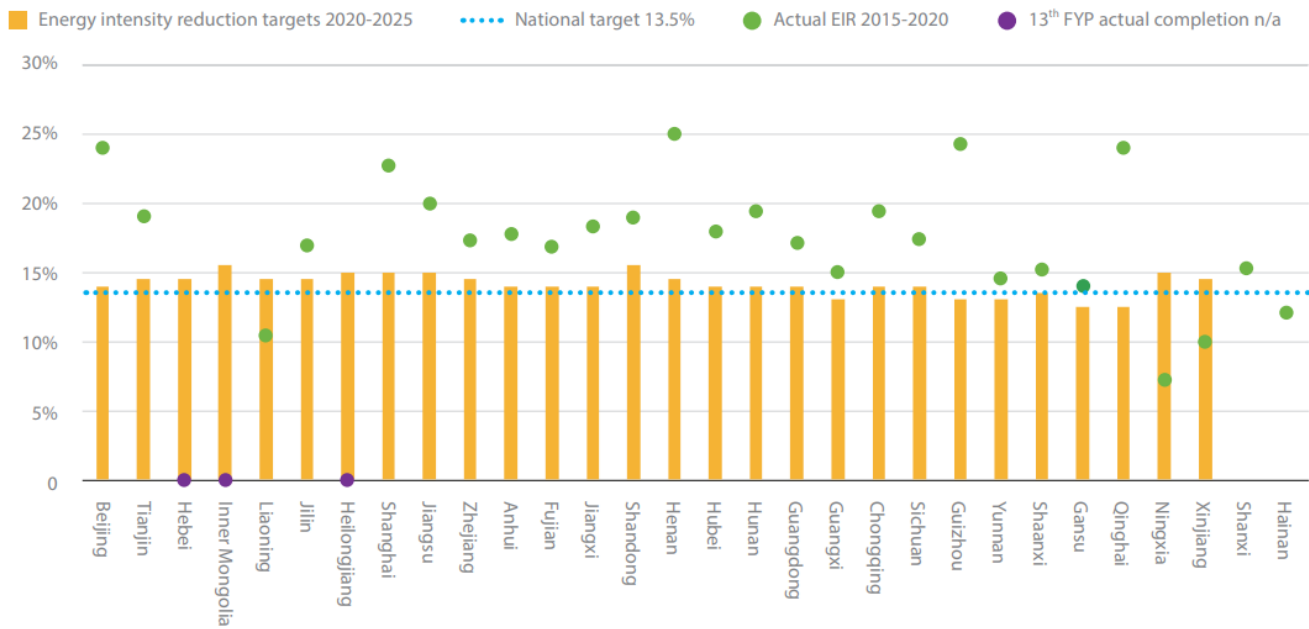


Source: CCNT

Energy Transition

During the 13th FYP period, twenty-three provincial regions exceeded the national target for reducing energy consumption intensity. During the 14th FYP period, most provincial regions set targets for reducing energy consumption intensity that were higher than the national level target.

FIGURE 21. Energy intensity reduction targets by provincial region in the 14th FYP period

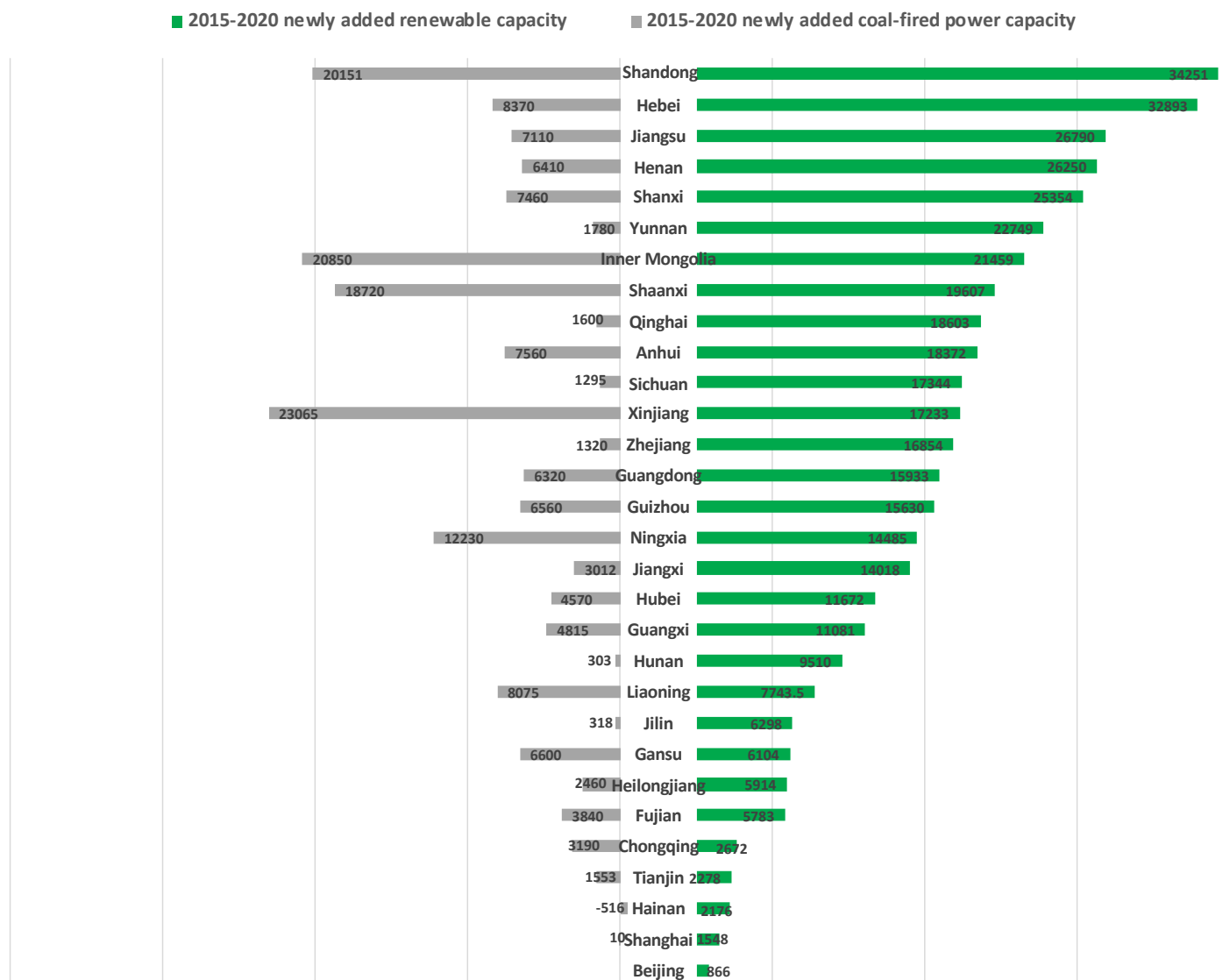


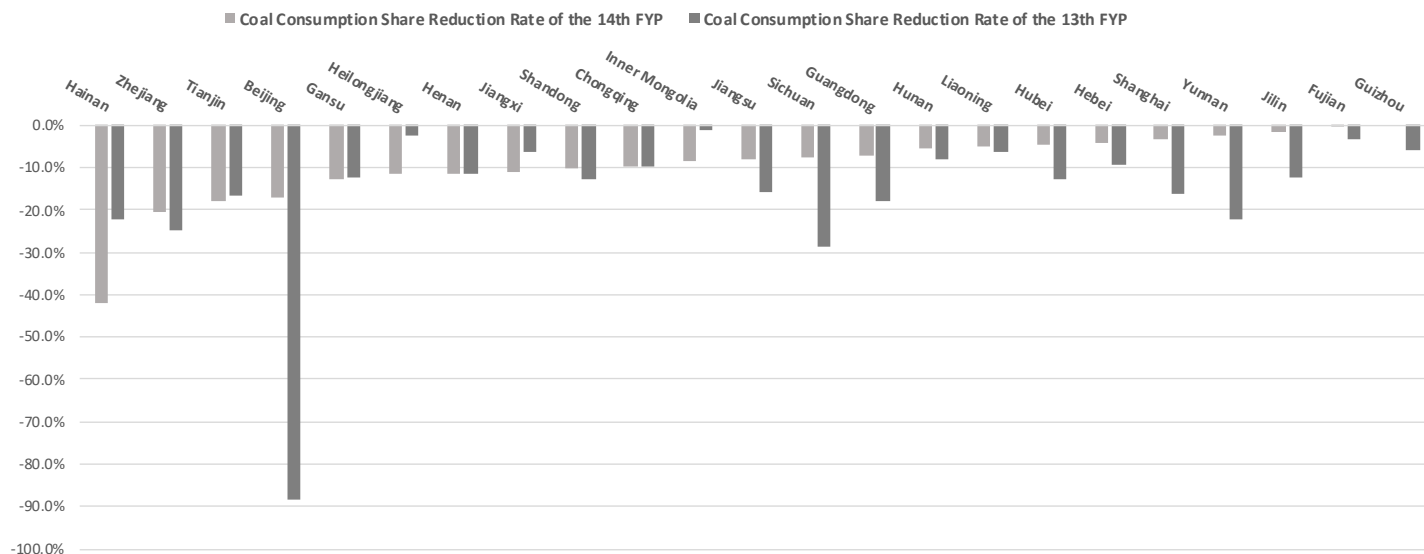
Notes: 1. Shanxi and Hainan announced that they would only "meet the national targets" regarding energy intensity reduction for 2025, so do not appear in the figure.
2. Energy intensity reduction completion data for Hebei, Inner Mongolia and Heilongjiang by 2020 (during the 13th FYP period) is not publicly available.
3. The 13th FYP completion rate for Anhui and Ningxia compare energy intensity reduction rates in 2019 and 2015.

Source: CCNT

In addition, during the 13th FYP period, twenty-eight provincial regions installed renewable energy exceeding the amount of new coal power installation. Among them, Shanxi, a major coal producing province, has installed far more new renewable energy than new coal power. At the same time, the share of coal consumption in twenty-six provincial regions decreased (Figure 22).

Although the national 14th FYP did not announce a target for total coal consumption or for the ratio of coal to other energy sources, all provincial regions have set a target of reducing the coal consumption ratio.



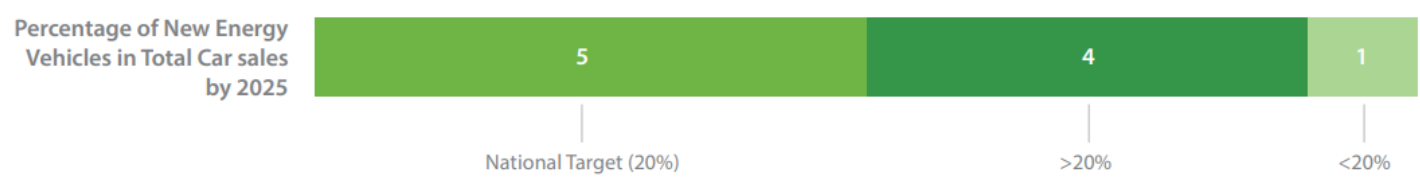


Industrial energy saving and efficiency enhancement

Industrial energy consumption remains down: During the 13th FYP period, energy consumption per unit of industrial added value has steadily decreased in twenty provincial-level regions. During the 14th FYP period, sixteen provincial-level regions have set energy consumption reduction targets for industrial value added that are higher than the national level.

Continued development of transportation electrification: During the 14th FYP period, nearly one-third of provincial regions have set targets for the proportion of new energy vehicle sales to total new vehicle sales by 2025, with five provincial-level regions setting targets higher than the national level.

FIGURE 25. Percentage of new energy vehicles in total car sales by 2025



Source: CCNT

Low-energy and near-zero-energy buildings are emphasized: During the 14th FYP period, more than half of provincial regions are developing or have implemented building standards for ultra-low-energy buildings or near-zero-energy buildings, which is higher than the national level target for new buildings meeting green building standards by 2025.

TABLE 6. Building codes for ultra-low energy buildings or near-zero energy buildings by provincial region

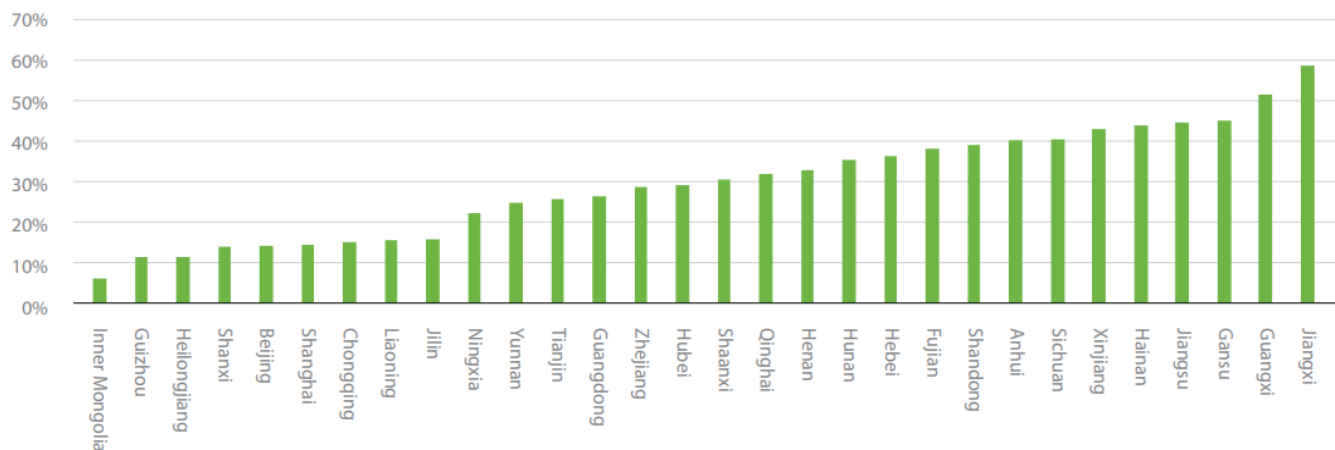
PROVINCIAL REGION	SUB-NATIONAL ULTRA-LOW-ENERGY BUILDING CODE IMPLEMENTED	SUB-NATIONAL NEARLY ZERO-ENERGY BUILDING CODE IMPLEMENTED	SUBNATIONAL BUILDING CODES
Beijing	√		Architectural Design Standards for Ultra-Low Energy Residential Buildings
Hebei	√		Evaluation Standards for Passive Ultra-Low Energy Buildings
Liaoning	√		Energy Conservation Design Standards for Ultra-Low Energy Residential Buildings
Heilongjiang	√		Energy Conservation Design Standards for Ultra-Low Energy Residential Buildings in Heilongjiang Province Energy Conservation Design Standards for Ultra-Low Energy Public Buildings in Heilongjiang Province
Shanghai	√		Technical Guidelines for Ultra-Low Energy Buildings in Shanghai (for Trial Implementation)
Jiangsu	√	√	Technical Guidelines for Ultra-Low Energy Residential Buildings in Jiangsu Province (for Trial Implementation) Technical Standards for Nearly Zero-Energy Building Inspection
Anhui	√	√	Energy Conservation Technical Standards for Passive Ultra-Low Energy Civil Buildings Technical Standards for Nearly Zero-Energy Buildings
Fujian	√		Technical Guidelines for Ultra-Low Energy Buildings in Fujian Province (Draft for Comments)
Shandong	√		Energy Conservation Design Standards for Passive Ultra-Low Energy Residential Buildings
Henan	√		Energy Conservation Design Standards for Ultra-Low Energy Public Buildings in Henan Province
Hubei	√		Energy Conservation Design Code for Passive Ultra-Low Energy Residential Buildings
Hunan	√		Energy Conservation Design Standards for Ultra-Low Energy Residential Buildings in Hunan Province
Guangdong	√		Technical Guide for Ultra-low Energy Buildings with Lingnan Characteristics
Sichuan	√		Technical Guide for the Application of Ultra-low Energy Buildings in Sichuan Province (Draft for Comments)
Shaanxi	√		Energy Conservation Design Standards for Ultra-Low Energy Residential Buildings
Xinjiang	√	√	Application Guidelines for Applicable Technologies for Ultra-Low Energy Buildings and Nearly Zero-Energy Buildings in Urumqi

Source: CCNT

3. As living standards improve, per capita building energy consumption and transportation energy consumption will continue to grow. Policy planning needs to take this into account.

In the building and transportation sectors, most provincial regions can meet existing energy saving and emission reduction targets. Energy efficiency targets for buildings are being strengthened, and the market for electric vehicles is booming. However, as service levels and living standards improve, actual per capita energy consumption from buildings and transportation will continue to grow, with attendant potential for growth in related GHG emissions. This means that low carbon policy in the building and transportation sectors needs additional strengthening.

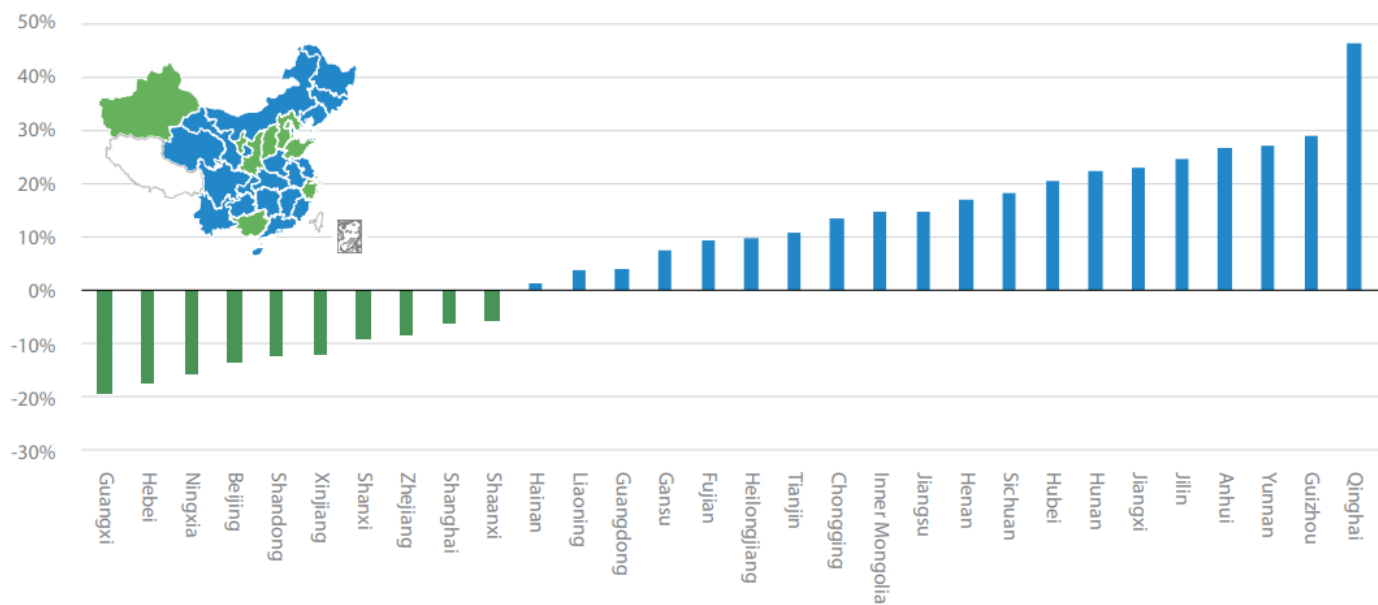
FIGURE 17. Per capita building energy consumption change (% , 2020 vs. 2015)



Source: Provincial level building energy consumption (operation phase) is calculated by iGDP based on based on Total Energy Consumption – Wholesale and Retail Trades, Hotels and Catering Services and Residential from provincial energy balance sheets of China Energy Statistical Yearbook. For a detailed methodology please see the working paper below.¹⁶

¹⁶ Yang, Li., & Li, Xindi. (2022). Research on statistical indicators and data of energy consumption and carbon emissions in China. Working Paper. Beijing. iGDP.

FIGURE 18. Per capita transportation energy consumption change (% , 2020 vs. 2015)



Source: Provincial level transportation energy consumption is calculated by iGDP based on based on Total Energy Consumption – Transport, Storage and Post from provincial energy balance sheets of China Energy Statistical Yearbook.

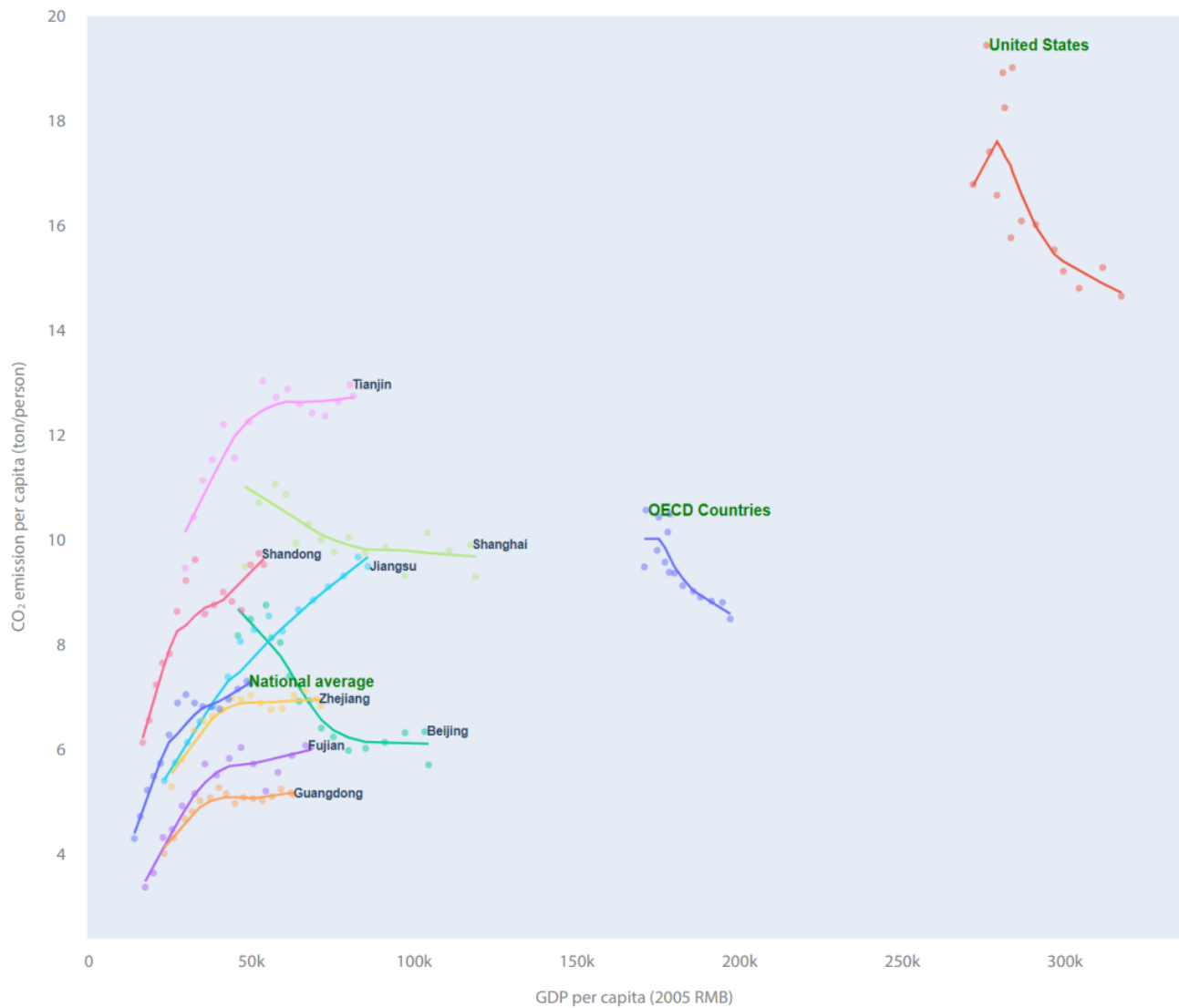
4. Provincial level measures still lack long-term effectiveness toward the 2060 carbon neutrality target.

The CCNT team used the iGDP Energy Policy Simulator (EPS) tool to perform a quantitative assessment of GHG emission trends in two representative provinces, Guangdong and Jiangxi. Taking into account the existing policy action requirements and development trends in the 14th FYP period, iGDP assesses that Guangdong's carbon

emissions have stabilized and are expected to peak before 2030, while Jiangxi's carbon emissions continue to rise and are expected to peak around 2030. In addition, the analysis shows that carbon emissions in the two provinces need to decline rapidly after reaching their peak in order to achieve the 2060 carbon neutrality target. However, current policies in both provinces are not likely to create this downward trend, so there is a need for stronger action going forward.

As the chart below shows, China's mitigation actions began at an earlier stage of economic development than countries that have completed industrialization. This means that in the nearly forty years between now and carbon neutrality, both development and decarbonization will be two parallel priorities that will need to be closely coordinated and balanced, making long-term planning particularly important.

FIGURE A2. Economic development and carbon emissions, comparison between selected provincial regions and developed countries²⁵



Recommendations

Develop long-term local climate action plans toward 2060

At present, no provincial regions have developed or released detailed carbon neutrality roadmaps due to the absence of a national requirement to do so. However, many regional think tanks and research institutions are already working on medium to long-term economic, energy, and carbon emission trend studies. Early research into and development of long-term local climate action plans is important for consistency of action and building consensus on policy.

Strengthen local action and promote inter-region complementarity

In demonstrating emissions reduction in industry and the effectiveness of other policy implementation, provincial regions should take into account the complementary advantages of different regions. For example, the roadmap for a clean transportation system in Hainan Province, which is the first province to propose a 2030 timeline for banning fossil fuel vehicles, is dependent on the province's location and economic characteristics. Hebei Province has a lot of research and policy experience in low energy buildings which can be used as a reference by other provinces. Shandong and Jiangsu have accumulated a wealth of experience and institutional capacity in low energy consumption industries and can also serve as a reference.

Early action to control non-CO₂ greenhouse gas emissions

There are still policy gaps in China's industrial, agricultural and waste management sectors in terms of non-CO₂ GHG emissions reduction. China's 2018 Second Biennial Update on Climate Change shows that the country's non-CO₂ GHG emissions had exceeded 2 billion tons of carbon dioxide equivalent (CO₂e) in 2014, accounting for 18% of the total GHG emissions that year. Estimates of non-CO₂ GHG emission trends in China from different studies also show that they are expected to reach around 3.4-3.7 billion tons of CO₂e by 2050, an increase of nearly half from 2015. Although the main control target of China's 2030 carbon peak target is energy-related CO₂e, it is crucial to control non-CO₂ GHG emissions in order to achieve the carbon neutrality target. The control of non-CO₂ GHGs is mentioned in the work programs for carbon peaking in all provincial regions, but it is not a priority, mainly because of a lack of systematic emissions studies or practical safeguard measures. However, research shows that there are substantial low-cost opportunities for emissions reduction in the agriculture, waste management and energy sectors, and that many measures for methane reduction in particular are relatively well established. It is recommended that China develop a comprehensive non-CO₂ GHG emissions plan or methane emissions reduction plan as soon as possible to tap the potential for emissions reduction in these areas.

Extensive Social Mobilization and Capacity Building

Engagement by industry, academia and China's research communities on the dual carbon goals is continuing to rise. Most provinces, cities, universities and large state-owned enterprises have set up new institutions or teams to conduct carbon neutrality strategic research and investment analysis. Major consulting organizations have also set up special sustainable development and carbon neutrality research teams. Leveraging all this talent and expertise already in place will have a powerful impact on the implementation of local climate actions.