PROJECT REPORT

Executive Summary

CLIMATE JUST TRANSITION ECONOMIC POLICY INSTRUMENTS IN CHINA

Subnational Case Studies of Guangdong Province and Shaanxi Province

Institute for Sustainable Communities (ISC)

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INSTITUTE FOR
Sustainable
Communities

PART
01. Background and Objectives

As China actively advances its carbon peaking and carbon neutrality goals, the dual-carbon framework has become a central driver of the country's green and low-carbon transition, which is increasingly evolving into a systemic transformation encompassing economic restructuring, balanced regional development, employment stability, and social equity.

International data shows that institutionalized Just Transition arrangements play a critical role in ensuring that low-carbon transition policies do not exacerbate regional disparities or social vulnerability during the transition process, and in fact strengthen the social foundation for sustained climate action.

Against this policy backdrop, this study defines Just Transition in China as a Coordinated Transition under the dual-carbon framework, and focuses on how subnational governments can deploy economic policy instruments to address two core challenges of the transition:

- **How can the benefits of the transition be designed to reach communities most affected by economic and climate shifts?**
- **How can the costs of the transition be shared more fairly across workers, industries and governments?**

This approach emphasizes the integrated advancement of climate goals, economic development, and social progress, ensuring that the transition remains inclusive and that no one is left behind.

PART 02.

Analytical Framework and Methodology

This study examines how international Just Transition experience can be adapted into practical policy instruments at the subnational level in China.

Two Chinese provinces are examined as representative subnational cases.

Shaanxi Province

reflects a coal-dependent region where coal underpins fiscal revenue, employment, and regional stability, and where the key challenge lies in managing the long-term fiscal, employment, and community impacts of coal reduction aligning with dual-carbon targets.

Guangdong Province

by contrast, represents a highly industrialized coastal economy facing a different set of transition risks, including the need to mitigate growing climate disasters-particularly in infrastructure-vulnerable areas-rising transition costs that heighten the risk of supply chain disruptions, and associated social risks such as employment instability, especially among low-wage and migrant workers.

For international comparison, the study selects Germany's Ruhr region and the U.S.' California as reference cases.

The Ruhr Region

exemplifies a government-led transition pathway characterized by long-term planning and stable fiscal commitments.

California

represents a market-driven model centered on carbon pricing, where institutionalized redistribution mechanisms convert emissions reduction revenues into sustained social investment.

Comparative analysis identifies both common challenges and differentiated constraints across region types, distilling institutional elements with practical relevance for China.

PART 06.

Design of Climate Transition Economic Policy Instruments

The study argues that climate transition economic policy instruments should be understood not as auxiliary fiscal measures, but as core governance arrangements for managing structural risks associated with the dual-carbon transition. Rather than providing short-term relief, their central function is to smooth social costs over time and across regions, while channeling incremental transition-related value back to affected communities.

Shaanxi Province: Policy Instruments for a Just Coal Transition

For Shaanxi, climate-related economic policy instruments should function both as a buffer against cumulative transition risks and as a mechanism for converting coal phase-down into long-term development opportunities. The study recommends establishing a coal phase-down compensation mechanism, with compensation benchmarks ranging from RMB 150 to 400 per ton of coal reduced. Scenario analysis under a proactive coal phase-down pathway conducted in this study suggested that coal production in Yulin, the largest coal-mining area in Shaanxi, could be reduced by approximately 14.25 million tonnes by 2030.

In addition, the study proposes the establishment of a provincial-level Coal Reduction and Green Transition Fund with a 10-year horizon and an indicative scale of RMB 30–50 billion. The fund size, equivalent to about 1% of Shaanxi's projected average annual GDP over the next decade, serves as a reference for the scale of sustained investment needed to support an orderly coal transition. Potential funding sources include coal fiscal reserves, central and provincial transfer payments, and revenues from energy quota trading. These resources would support ecological restoration, workforce resettlement, industrial transformation, and the deployment of renewable energy alternatives in post-mining areas.

From an institutional perspective, these arrangements would translate coal control and emissions reduction mandates into visible and sustained development investment, embedding Just Transition principles into the implementation of climate policy.

PART 04.

Energy Transition Risk in Shaanxi Province

As one of China's major coal-mining regions, Shaanxi remains highly dependent on coal for economic output, fiscal revenue, and employment. In 2022, coal mining and processing directly employed approximately 180,000 workers. When upstream and downstream supply-chain effects are taken into account, coal-related activities supported roughly one million jobs, accounting for around one quarter of total employment in the three major coal-mining cities of Yulin, Yan'an, and Tongchuan.

Over the coming decades, as coal production gradually peaks before 2030 and declines toward near zero by 2060, the sector is expected to undergo a structural phase-down. This transition is unlikely to pose significant short-term risks to large state-owned enterprises, whose output value and profitability remain largely protected. Instead, adjustment pressures fall mainly on small and medium-sized mines and mining-dependent communities, where gradual job losses and local economic decline over time inevitably affect the livelihoods of around one million workers and their families.

At the same time, climate risks are compounding Shaanxi's transition pressures. In 2024, extreme rainfall and related geological disasters caused direct economic losses of approximately RMB 16.4 billion in the province. Combined with volatile energy-related fiscal revenues, unstable agricultural income, and rigid public expenditure obligations, local governments are facing increasing difficulty in balancing emissions reduction, economic stability, and social protection.

In 2023, Shaanxi's coal industry generated approximately RMB 576 billion in revenues, equivalent to about 20 percent of the province's total industrial output. As this revenue base is expected to erode over time post-2030, the current period represents a critical, potentially fleeting time window to institutionalize fiscal instruments to build reserves for future transition-related adjustment and stabilization.

PART
05.

Climate Transition Risks in Guangdong Province

Guangdong faces a distinct set of challenges under intensifying climate impacts. As a highly industrialized coastal province, it is increasingly exposed to climate risks such as typhoons, flooding, and heatwaves, which disrupt infrastructure, industrial activities, and livelihoods. The average annual number of high-temperature days in the Pearl River Delta has shown a sustained upward trend, increasing by approximately 3.6 days per decade.

These climate pressures are already translating into measurable economic and productivity losses. Extreme heat alone resulted in an estimated loss of 31.5 billion labor hours nationwide in 2020—equivalent to around 1.3% of total labor time and corresponding to an estimated GDP loss of approximately 1.4%—with southern provinces such as Guangdong bearing a disproportionate share of these impacts. In addition, in the spring of 2024, a week-long heavy rainfall in Guangdong triggered approximately 34,700 insurance claims, with reported insured losses of around RMB 699 million. Insurance coverage was limited, with payouts accounting for only a very small share of the overall economic impacts, leaving most costs to be absorbed by public institutions, enterprises, and households.

At the same time, low-carbon transition costs—arising from energy and carbon control targets as well as environmental compliance requirements—are transmitted along supply chains, placing sustained pressure on small and medium-sized enterprises. These pressures do not take the form of a one-off shock, but instead accumulate over time through higher investment costs, tighter financing conditions, and rising market entry barriers.

Meanwhile, Guangdong's carbon market, green electricity trading, and other market-based transition mechanisms are already generating incremental green premiums of just over **One Billion RMB**. However, due to the absence of institutionalized arrangements, these gains are not yet directly used to help balance the social and economic costs of the transition. Addressing this gap requires mechanisms that can channel market-based green premiums into sustained public investment, consistent with the principle of sharing transition benefits and costs.

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Guangdong Province: A Provincial Dual-Carbon Transition Fund as a Catalytic Policy Instrument

Guangdong faces substantial financing demands in advancing its dual-carbon transition. This study finds that over the next five years, investment needs in underinvested counties, townships, and communities are expected to reach approximately RMB 300 billion. Around half of this amount will need to be met through public and policy-oriented funding-far exceeding the capacity of any single fiscal or policy instrument.

To address this gap, the study recommends establishing a Provincial Dual-Carbon Transition Fund during the 15th Five-Year Plan period (2026–2030), with an indicative size of approximately RMB 5 billion.

Guangdong already has access to multiple market-based sources categories (see Policy Box: Estimation of Transition Fund Sources), yet without clear rules for earmarking and aggregation, these revenues remain fragmented and difficult to deploy. A simple, transparent allocation framework can turn dispersed market revenues into a stable and usable source of transition finance, as illustrated below.

Policy Box: Estimation of Transition Fund Sources in Guangdong

Funding channel	Source of funds	Indicative allocation percentage	Estimated 5-year funding size (million RMB, medium value)
Carbon market	Revenues from allowance allocation and auctions	**25%**	**560**
Green electricity trading	Green power price premiums	**20%**	**350**
Carbon inclusion mechanisms	Enterprise and institutional purchases of micro-carbon credits	**20%**	**150**
Impact investment	green bonds, sustainability-linked bonds, and related instruments	**1%–5%**	**4500**

Taken together, these category-based estimates define the funding envelope within which a streamlined RMB 5 billion Transition Fund can operate effectively. The fund is not intended to function as a large-scale investor. Rather, it is designed as a policy instrument, a catalytic hub that links transition rule-setting with large-scale capital mobilization. Through its design, the fund leverages a relatively limited capital base to unlock much larger investment flows via two complementary channels:

Public and policy-oriented capital

By coordinating fiscal funds and policy-based financing, a portfolio-based model combining financially viable and public-interest projects is used to mobilize approximately RMB 150 billion in investment.

Market-based impact capital

Mobilization of private impact investment through scalable and replicable project models, whereby economies of scale help reduce unit costs, while a stable policy environment minimizes investment risk, thereby accelerating investment also on the order of RMB 150 billion.

PART 07.

Conclusion

As China advances its dual-carbon agenda, administrative mandates and short-term fiscal measures alone are unlikely to sustain a stable or socially acceptable transition. International experience suggests that emissions reduction, economic development, and social protection can only be effectively aligned through institutionalized, long-term economic policy instruments.

Experiences from Shaanxi and Guangdong show that while regional transition pathways vary widely, they share a common need for mechanisms that smooth transition costs, guide long-term investment, and support regional coordination. In this context, coordinated transition funds offer a practical approach for local governments to distribute transition costs more equitably, share transition benefits, and strengthen the social foundations of climate action.

ISC in China: Advancing Climate Transition that Works for People

The Institute for Sustainable Communities (ISC) is an international nonprofit organization founded in 1991 with a mission to help communities address environmental, economic, and social challenges and build a more sustainable future. ISC believes that climate transition must ultimately work for people by improving livelihoods, strengthening communities, and supporting inclusive economic development.

ISC's China program, formally registered in China since 2020, focuses on practical pathways for a just transition. Its work is organized around three pillars: climate transition policy instruments, resilient communities, and sustainable supply chains. Through peer learning, capacity building, and pilot initiatives, ISC collaborates with governments, businesses, and communities to develop scalable climate solutions that are economically viable and socially equitable.

For more information, please visit sustain.org and iscchina.org.

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