

Policies and Institutions to Support Carbon Neutrality in China by 2060

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1. Motivations underlying the research

An extensive and growing literature in environmental economics has focused on China's environmental policies, but only a limited set of studies has reviewed China's policies related to climate change, prompting this review paper. China's leadership has announced its aim to achieve CO₂ neutrality at the national level by 2060. This review examines the extent to which current policies and institutions would need to evolve to support deep decarbonization in the world's largest emitting nation.

2. A short account of the research performed

Here, we review the major developments in climate policies and institutions that are projected to drive transition in China's energy system. We ask how well matched these developments are to the goal of achieving CO₂ neutrality by 2060. Where relevant, we draw on other policy domains, such as energy management and local environmental protection, which offer insight into how policies and institutions can work together to support meaningful progress toward CO₂ neutrality. We further consider international dynamics.

China's international pledges have been reflected in plans and targets, which have been implemented via a combination of command-and-control and, more recently, market-based policies. The environmental economics literature on instrument choice has studied the interactions of various forms of climate policy instruments in a range of global contexts. Combinations studied include interactions between carbon pricing systems (carbon taxes or cap-and-trade) and sector-specific technology requirements or performance standards. This literature finds that combining instruments reduces cost effectiveness. However, precisely because they are more prescriptive, technology requirements and standards reduce uncertainty by defining what actions will be rewarded.

This review finds that China's climate policies often blend command-and-control and market mechanisms: in sectors or geographies bound by targets that are determined via the central planning process. This approach has roots in China's broader economic opening and reform process, in which markets initially played narrowly scripted roles and in many ways remain subordinate to state priorities. Applied to energy-related environmental policy, blending command-and-control and market-based instruments has at times faltered, for example, in the case of SO₂ trading in the early 1990s. Aside from this brief experiment, until recently most of China's environmental policies have drawn heavily on command-and-control designs. However, over the past decade, a renewed emphasis on introducing market mechanisms in broader economic policy has been applied to climate policy, as a means of limiting costs, including the need for subsidies.

3. Main conclusions and policy implications of the work

Our policy review concludes with three observations. First, efforts in China to mitigate climate change have thus far largely delivered on targets set in national plans. None of these targets has been as ambitious as the country's 2060 carbon neutrality goal. Second, while command-and-control poli-

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cies have been effective in providing clarity on who is responsible for specific climate change mitigation actions, concerns about rising costs and weak incentives for firms to supply CO₂ reductions have led policymakers to rely increasingly on market-based instruments to encourage emissions reductions. Third, climate targets have proven easier to achieve when responsibility is clearly assigned and when targets align with the near-term objectives of national plans. These objectives include maintaining steady economic growth, reducing industrial overcapacity, expanding clean energy industries, improving local air quality, and strengthening the nation's stature as a climate leader internationally. Although this multiplicity of targets may limit cost effectiveness in the near term, it will be important to generate early beneficiaries that can ensure the durability of the system and who stand to gain from a shift over time to expanded reliance on market mechanisms.