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Analysis of Synergistic Effects of Low-Carbon Actions and Climate Change Adaptive Measures

Wang Wenjun and Zheng Yan

Abstract

The collaborative actions of mitigation and adaptation have stirred new discussions in the research of addressing climate change. This paper summarizes the literature and practices of collaborative management of mitigating and adaptive actions. The study shows that it is feasible to manage the actions of mitigation and adaptation collaboratively. Using key elements of synergistic management, this paper conducts an in-depth analysis on the synergistic effects produced by three types of adaptation and mitigation actions in the energy sector. The research found that about half of the actions could produce synergistic effects. Finally, this paper studies the possibility of collaborative management in addressing climate change in China's Guangdong Province, and gives suggestions based on the analysis.

Keywords

low-carbon development – adaptation actions – synergistic effect

Reducing greenhouse gas emissions (GHG) and adapting to climate change are two crucial tasks for minimizing climate change risks. (IPCC AR4, Working Group I & III, 2007). Even if the most drastic emissions reduction measures are adopted, we may not avoid the negative impacts of global climate change on human society, so that actions of adapting to climate change are imperative.

* Wang Wenjun, Guangzhou Institute of Energy Conversion, Chinese Academy of Sciences, email: wangwj@ms.giec.ac.cn.
Zheng Yan, Institute of Urban & Environmental Studies, Chinese Academy of Social Sciences.
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If reductions and mitigation fail to be implemented, the dramatic effects of climate change would sooner or later undermine human efforts at sustainable development. The effective management of reduction and mitigation measures alongside increasing local adaptation capability by means of mitigation and incorporating low-carbon measures into adaptation actions should undoubtedly be the ultimate goal of climate policies for most regions of China. As one of the largest GHG emitters in the world, China is faced with the herculean tasks of reducing its GHG emissions, while many regions struggle with vulnerable economic, natural, and geographical conditions, and simultaneously adapting to the changing climate system. It is essential to manage actions for mitigating and adapting to climate change in China collaboratively.

I Research Background and Overview: Collaborative Management of Low Carbon Measures and Adaptation Actions

Reducing GHG emissions, as an important component of low-carbon development projects, is closely linked to projects in human adaptation to climate change. The spatial and temporal patterns of GHG emissions reduction interact with those of adaptation, and the implications and effects of mitigation overlap with those of adaptation (Gitay et al., 2001; Vellinga et al., 2001; Cohen et al., 2001). In the process of addressing climate change, policy makers should take these points of interaction into consideration, identifying and effectively managing the synergistic effects from those actions. Low-carbon development can thus be efficiently achieved with low costs and alongside sustainable socioeconomic development.

A Research Background

Before the concept of collaborative management of mitigation and adaptation actions was proposed by the IPCC, mitigation and adaptation were treated as two independent actions and consequently policy makers tended to develop two separate sets of action plans to address them. Mitigation-adaptation interactions were not taken into consideration during policy design. Thanks to ongoing research on global climate change, many scholars have found that while many measures were designed to adjust human societies or industries to prepare for climate change, these measures were likely to increase GHG emissions and undermine low-carbon development efforts. On the other hand, some low-carbon measures, although economically and technically feasible, might increase the ecosystems’ vulnerability and as a result reduce many local areas’ resiliency against climate change effects. Given this paradox, some