Theme: Towards Low-Carbon Energy Systems

Sustainable Bioenergy Use and Climate Change in China

-A Spatial Agent Model for the Case of Jiangsu Province

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In recent decades China has enjoyed rapid growth in economy and society as the world's fastest-growing major economy. Accordingly, it faces several great challenges including a severe shortage of energy supply, increasing greenhouse gas emission, and an enlarging unbalance between urban and rural areas. One upcoming solution that tackles all three issues is bioenergy from biomass. Biomass can be the carrier not only to boost the energy transition from fossil fuels to renewable energies in order to mitigate climate change, but also to reconstruct the traditional agriculture which has a history of several thousand years in China so as to create a precious development opportunity for backward rural areas. However, rapid growth in bioenergy use has also raised concerns about its impacts on the environment, land use, water resources and food security. The fading political support for biofuels became obvious when the European Union adjusted its mandates for biofuels and considered conditions and criteria for the sustainable use and certification of biofuels.

In order to strengthen the benefits and reduce the risks of bioenergy, this project plans to design a tailored sustainable development approach of bioenergy for China. Following the whole life cycle of bioenergy, this research seeks to combine the existing principles, criteria and requirements of the International Sustainability and Carbon Certification (ISCC) system with the local situation of China. Through the integration of qualitative and quantitative analysis, that is, setting up both a conceptual model and a computational model, this project aims to optimize the distribution of biomass feedstock and bioenergy infrastructure, as well as propose innovative measures and streamlined strategies for regional governance towards each bioenergy stakeholder which meet the requirements of technical feasibility, economic viability, environmental sustainability and societal acceptability.