

***EFFECTS OF URBANIZATION ON RURAL RESIDENTIAL  
BIOMASS ENERGY INTENSITY AND CO2 EMISSIONS IN  
SOUTHWESTERN CHINA: PANEL DATA EVIDENCE FROM  
PREFECTURAL-LEVEL CITIES IN SICHUAN PROVINCE***

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**Abstract**

Limited evidence has been provided in literature on the effects of urbanization on rural residential biomass energy intensity and CO<sub>2</sub> emissions. Under this circumstance, based on the STIRPAT model, this paper adopts different panel regression techniques like pooled ordinary least squares (POLS), fixed-effect (FE), fixed effects with instrumental variables (FE-IV) and first difference fixed effects (FD) to estimate the impacts of urbanization on rural residential biomass energy intensity and CO<sub>2</sub> emissions using the data of 21 prefectural-level cities in Sichuan Province of China over the period from 2006 to 2013. The results show that the relationship between urbanization and the intensities of different types of energy is not robust. Nevertheless, increasing income and area ratio of central urban build-up zones to cultivated land can reduce the intensities of traditional biomass energy and non-biomass energy. Meanwhile, rural population and industrialization positively and significantly affect biogas intensity, while they negatively influence the intensities of traditional biomass energy and non-biomass energy. On the other hand, energy intensities have significant and positive influences on CO<sub>2</sub> emissions. Particularly, biogas has relatively lower effects on CO<sub>2</sub> emissions. Moreover, although the impact of urbanization on CO<sub>2</sub> emissions is mixed, the combined effect of increasing all urbanization measurements will lead to higher CO<sub>2</sub> emissions.

**Keywords:** urbanization, CO<sub>2</sub> emissions, energy intensity, residential biomass energy, rural areas

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