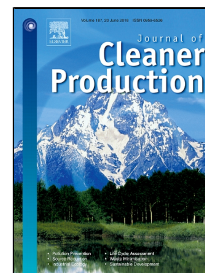


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Urban daily travel carbon emissions accounting and mitigation potential analysis using surveyed individual data

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Abstract

Our study focuses on the carbon emission and mitigation potential in the domain of daily travel in Beijing. Using a sample with the focus on working class, the average individual carbon emissions from daily travel are computed as 1.46 kg/day•person and 2.40 kg/day•person for weekday and weekend. Except for residents who need to conduct more long-distance trips, the main contributor to the emissions of the rest high emitters are not the need of longer daily travel distances or the need to conduct more long distance trips, but the need to use cars more intensively for trips with similar distances compared with low emitters. High emitters are associated with the characteristics of being male, having higher income, owning cars, and being in the age between 30s and 40s. On the other hand, living within fifth ring and having good accessibility to public transport are associated with lower emissions. We innovatively use trip-based information to obtain a more relevant and realistic assessment of mitigation potential through mode shift under the current transport system. The mitigation percentage can be as high as 20% to 25% if only travel time is considered, but will be substantially constrained by practical barriers. Therefore mitigation policy for daily transport should not only focus on improving travel time of low emission modes to comparable levels with cars but also tackle practical barriers for car drivers to use low emission modes.

Keywords: Daily travel; Carbon emissions; Mitigation potential; Individual data

1 Introduction

Accounting for nearly a quarter of global energy-related greenhouse gas emissions, transport sector is acknowledged as a challenging sector for mitigation (IPCC, 2014). Although currently China's transport demand per capita is relatively low, its transport demand and related energy consumption and carbon emissions will grow much faster than developed countries (IEA, 2013; Wang et al., 2015). Fast growing income and consumption in China are the major drivers of increased travel distances and vehicle usage, which in turn is associated with rapidly growing transport emissions.

Travel distances and the share of motorized travel at the aggregate level are determined by individual's travel

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