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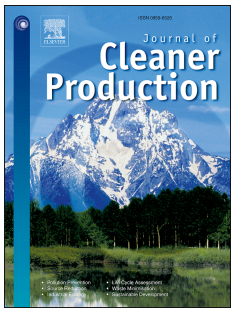

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Electric fence planning for dockless bike-sharing services

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Abstract: A new generation of bike-sharing services is emerging in China. With this service, bikes can be unlocked and paid by using a smartphone and then picked up and left anywhere at users' convenience. The unprecedented development of dockless bike-sharing services results in considerable socioeconomic and environmental benefits but also creates new urban issues. One of the most severe issues is users' inappropriate parking behaviour. To solve this problem, electric fence (or geo-fence) policy and technology have been introduced in China to guide users to park bikes in designated zones. In this paper, we first propose a methodological framework to support electric fence planning for dockless bike-sharing services. We then apply our framework in a case study of Shanghai using a big dataset of bike trips. Results show that when the number of planned electric fences is 7,500, our electric fence plan can cover 91.8% of total parking demand. In addition, our plan can ensure that at least 95.8% of all bikes can be docked at one of planned electric fences and can help efficiently and accurately determine suitable locations for setting up planned electric fences.

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