

# Achieving sustainable transport through resource scheduling: A case study for electric vehicle charging stations

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## ABSTRACT

Electric vehicles support low-carbon emissions to revitalize sustainable transportation, and more charging stations are being built to meet the daily charging demand. Charging piles and service workers are the most important resources for electric vehicle charging stations, and the scheduling of these resources is an important factor affecting the charging stations' profits and sustainable industrial development. In this paper, we simulate the charging piles and service workers in charging station resource scheduling and analyze the impacts of the number of service workers, the charging pile replacement policy and the charging pile maintenance times on an electric vehicle charging station's profits. An orthogonal test can achieve the following optimal resource scheduling results when their range is known: (1) In the lifetime of the charging pile, seven maintenance times are needed; (2) Even if the charging pile is still in normal condition, it needs to be replaced in order to achieve the maximum profits for the charging station; (3) a comprehensive analysis of service efficiency and service costs indicates that 8 service workers are needed to achieve the optimal profits for the charging station. Therefore, the scientific contribution of this research is to establish one resource scheduling simulation model that can assess the effects of the number of service workers, the charging pile replacement policy and the charging pile maintenance times on charging station revenues and to obtain the optimal results. In addition, if the model parameters change, we can still obtain the optimal results.

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