

Carbon footprint savings from free fare public transport policies. The case of Marbella

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Abstract: One of the main goals of free fare public transport policy is to reduce car use by promoting other more sustainable modes of transport. The aim of this work is to develop a methodology that allows us to evaluate the carbon footprint savings derived from the implementation of these policies based on the CO₂ emissions avoided by the trips captured from the car mode. To do this, we will study the case of the city of Marbella, comparing the evolution of the demand for bus trips, before and after COVID-19, with other cities that do not have free public transport. As a result, a total saving of 835.75 tonnes of CO₂ emissions to the atmosphere is estimated for the study period 2019-2022. This methodology is a useful tool to measure the effectiveness of these policies in terms of environmental impact.

Keywords: Free Fare Public Transport; FFPT; Carbon footprint; Environmental impact; Bus

1 Introduction

Free fare public transport policies (FFPT) have been discussed and tested for decades, mainly in cities in Europe and the United States (FFPT, 2022). In general, FFPT is considered more appropriate to apply in smaller cities than in cities with larger transport markets and more diversified fare systems (Kębłowski, 2017). Currently, this policy is on the rise due to society's increased awareness of the benefits of promoting the use of more sustainable transport. This is the case in Marbella, where registered residents can use public transport free of charge from April 2019.

2 Objectives

The aim of this work is to develop a methodology that allows us to evaluate the carbon footprint savings derived from the implementation of FFPT policies based

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on the CO₂ emissions avoided by the trips captured from the car mode. To do this, we will study the case of Marbella, comparing the evolution of the demand for bus trips, before and after COVID-19, with other cities that do not have FFPT.

3 Methods

The methodology determines the variation in demand for public transport in the city under study compared to other. It then establishes the proportion of trips due to FFPT and, from there, the number of trips captured from the car mode. These data allow the CO₂ emissions saved to be calculated. Data from Marbella Town Hall, from OMM (2022), and from an ad hoc survey (GIGTT, 2022) have been used.

4 Results

In relation to the number of trips, a significant increase is observed in Marbella, while the rest of Spain has not yet recovered pre-pandemic levels. This demonstrates the effectiveness of the FFPT in increasing the use of public transport, which is in line with published scientific literature, such as Cools et al. (2016). In terms of modal shift, 35% of the total increased bus trips in Marbella were captured from the car mode, confirming the FFPT's potential uptake from previous studies (De Witte et al., 2008). In terms of environmental impact, a significant reduction of the carbon footprint has been obtained, namely a total saving of 835.75 tons of CO₂ emissions

5 Conclusion

The designed methodology proves to be a useful tool for Transport Authorities to measure the effectiveness of FFPT policies in terms of environmental impact, and together with other policies lead to the achievement of a more sustainable mobility.

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