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THE ROAD TO ZERO-EMISSION FLEETS: CHALLENGES, OPPORTUNITIES, AND THE ROLE OF DATA-DRIVEN DECISION-MAKING

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Abstract – The transition from internal combustion engine (ICE) fleets to zero-emission vehicles (ZEVs) is a critical step toward achieving corporate sustainability and regulatory compliance with European Union (EU) decarbonization targets. However, many businesses face significant challenges in fleet electrification, including high upfront costs, uncertain operational feasibility, and inadequate charging infrastructure. Traditional fleet transition approaches often rely on general estimations rather than data-driven strategies tailored to specific fleet usage patterns and business constraints. This paper explores the current state of corporate fleet electrification, highlighting key barriers and the limitations of existing transition models. It emphasizes the critical role of data analytics, predictive modelling, and optimization techniques in facilitating cost-effective and operationally viable fleet transformation. By leveraging real-world fleet operation data from *carmonitor.eu* – such as trip duration, energy consumption, and route characteristics — combined with external factors like vehicle market availability and energy pricing, businesses can develop informed transition strategies that minimize financial risk and maximize sustainability benefits. We propose a framework for a data-driven decision-support system that integrates fleet monitoring, scenario simulations, and tailored recommendations for electrification. This system aims to provide corporate decision-makers with actionable insights that optimize vehicle replacement strategies, charging infrastructure planning, and long-term fleet efficiency. The paper concludes by outlining key research directions and the next steps toward developing a robust, scalable tool for fleet transition optimization. Through this approach, businesses can make informed, strategic decisions that accelerate their path toward zero-emission mobility while ensuring economic and operational feasibility.

Keywords – *Electric Vehicles (EV); fleet electrification; data-driven decision-making; corporate sustainability and mobility; logistics and fleet sustainability.*

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