Scheduling and Charging Strategy for a Mixed Bus Fleet with Electric and Traditional Buses

Vaibhav M Sannakki[1], Gajanand Sharma[2]

[1,2] *IIT KHARAGPUR, India*

ABSTRACT

The rising travel demand in Hubli-Dharwad has resulted in heightened dependence on public transportation, primarily fulfilled by conventional fuel buses, which substantially contribute to pollution. The government's FAME III program seeks to enhance the adoption of electric vehicles, with a particular focus on 7000 electric buses. This research concentrates on improving scheduling and charging strategies for the area's hybrid fleet of electric and conventional buses. The study advocates for the incremental integration of electric buses (5%-30%) alongside optimizing fleet scheduling. A network modeling approach tackles the Electric Vehicle Scheduling Problem (E-VSP) by balancing the deployment of traditional and electric buses, optimizing routes, and identifying charging points to minimize downtime and enhance efficiency. The research formulates effective charge plans, guaranteeing recharging during offpeak hours to minimize service interruptions. The move to electric buses is viable, diminishing pollution and dependence on traditional buses, while providing a scalable model for urban transit planning in other municipalities.

Keywords: FAME III program; Electric Vehicle Scheduling Problem (E-VSP); Hybrid fleet optimization; Pollution reduction; Off-peak charging strategy