Location Selection of Battery Swap Station using Fuzzy MCDM Method: A Case Study in Indonesia

Meilinda Fitriani Nur Maghfiroh[a*], Chathumi Kavirathna[b]

a Department of Industrial Engineering, Universitas Islam Indonesia, Yogyakarta, Indonesia

b Department of Industrial Management, Kelaniya University, Colombo, Sri Lanka

Abstract

The rise of Electric Vehicles (EVs), supported by battery swap systems, brings various advantages, including reduced waiting times, lower upfront costs, and alleviating range anxiety. Battery Swap Stations (BSS) enhance green transportation by providing convenient options for EV users, especially in regions with limited fast-charging infrastructure. Many EVs, especially two-wheelers, need battery recharging after reaching their driving range. BSS availability can eliminate charging inconveniences for busy EV drivers. However, selecting BSS locations is often challenging due to budget constraints. This study aims to understand the criteria for selecting BSS locations in Indonesia. Potential location alternatives were identified using a fuzzy multi-criteria decision-making approach and input from government officials and industry experts. Factors like driving range, EV capacity, and budget availability were considered in determining the order of BSS establishment. The study found that technological and social aspects were the top criteria, suggesting that BSS development should prioritize established locations like mini markets and petrol stations.

Keywords: