

Optimization of Determining the Location of the Battery Swap Station for the Electric Motorcycle used by the Online Transportation Company (PT X) by Paying Attention to the Use of Solar Energy as an Energy Source

Laras Safitri and Farizal F
Department of Industrial Engineering
University of Indonesia
Depok, Indonesia
larassftr@gmail.com, farizal@eng.ui.id

Abstract

Electric vehicles existed before conventional vehicles. however, its existence is invincible with conventional vehicles because electric vehicles have limitations in charging. Electric vehicles have to take a long time to charge, that's why their existence is inferior to conventional vehicles. Today environmental issues are a concern throughout the world. Carbon emissions result from many human activities. Energy and transportation producers are the largest sources of carbon emissions. In Indonesia, energy producers are in first place, contributing 43.88% of carbon emissions and second place, namely transportation with a value of 24.64%. The limitation of electric vehicles in Indonesia is the lack of a Battery Swap Station (BSS) ecosystem. The set covering problem method in this study will provide an optimum location for installing a battery swap station by taking into account the capacity constraints of each prospective facility when using a solar power plant as the BSS energy source. The location for selecting BSS candidates is the location where PT X cooperates with landlords with a profit sharing system. The researcher determines 32 (thirty two) BSS candidate points in each sub-city where the landlord has worked with PT X. The set covering problem will be worked on with Excel's Solver. It is found that 22 (twenty two) optimal BSS points must be built with the constraint that the capacity of each facility must exceed the number of requests. The visualization of the location mapping is provided using ArcGIS.

Keywords

Battery Swap Station, Electric Vehicle, Solar Power Plant, Optimization.

Biographies

Laras Safitri is a third-year postgraduate student at University of Indonesia, Depok, Indonesia, majoring in Industrial Engineering, minoring in Industrial Management. She earned Bachelor of Engineering degree in Metallurgy and Material Engineering at University of Indonesia, Depok, Indonesia. Her research interests are in strategic management and human factors.

Farizal F is an assistant Professor in Management system in the Industrial Engineering Department, faculty of Engineering Universitas Indonesia. He earned a Bachelor of Engineering degree from Universitas Indonesia, a master's degree from Oklahoma State University, and a Doctoral degree from the University of Toledo.