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Location Models for Alternative Fuel Stations: A Brief Survey

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ABSTRACT

Due to their efficient and sustainable natures, hydrogen fuel cell vehicles are expected to replace traditional gasoline internal combustion engine vehicles in the future. The increasing number of hydrogen fueled vehicles rises the need for installing additional hydrogen fuel storage areas to serve as suppliers for the fuel retail stations in city centers. With this requirement, planners face the problem of locating and sizing hydrogen storage areas. These storage areas are semi-desirable in nature since they pose both social and transportation costs to the nearby communities. In this study, we tackle the location and sizing problem of hydrogen energy storage areas and propose a bi-objective integer linear model. Adopting a goal programming modelling framework, we minimize the total weighted unwanted deviations from each goal, i.e. minimizing transportation cost and social disutility. We demonstrate the performance of our modelling framework on a case study for the Anatolian side of Istanbul, Turkey. We also implement a posteriori approach and determine an efficient frontier to assist decision-makers and investors.

Keywords: energy; goal programming; location; optimization; storage.