World Academy of Science, Engineering and Technology
International Journal of Transport and Vehicle Engineering
Vol:8, No:03, 2014

Application of Fuzzy TOPSIS in Evaluating Green Transportation Options for Dhaka Megacity

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Abstract : Being the most visible indicator, the transport system of a city points out how developed the city is. Dhaka megacity holds a mixed composition of motorized and non-motorized modes of transport and the number of vehicle figure is escalating over times. And this obviously poses associated environmental costs like air pollution, noise etc. which is degrading the quality of life in the city. Eventually sustainable transport or more importantly green transport from environmental point of view has become a prime choice to the transport professionals in order to cope up the crisis. Currently the city authority is planning to execute such sustainable transport systems that could serve the pressing demand of the present and meet the future needs effectively. This study focuses on the selection and evaluation of green transportation systems among potential alternatives on a priority basis. In this paper, Fuzzy TOPSIS - a multi-criteria decision method is presented to find out the most prioritized alternative. In the first step, Twenty-one individual specific criteria for sustainability assessment are selected. In the following step, experts provide linguistic ratings to the potential alternatives with respect to the selected criteria. The approach is used to generate aggregate scores for sustainability assessment and selection of the best alternative. In the third step, a sensitivity analysis is performed to understand the influence of criteria weights on the decision making process. The key strength of fuzzy TOPSIS approach is its practical applicability having a generation of good quality solution even under uncertainty.

Keywords : green transport, multi-criteria decision approach, urban transportation system, sustainability assessment, fuzzy theory, uncertainty
Conference Title : ICSUTE 2014 : International Conference on Sustainable Urban Transport and Environment
Conference Location : Madrid, Spain
Conference Dates : March 27-28, 2014