

Abstract of the doctoral thesis:

*‘A method of choosing public transport lines
to be operated by electric buses’*

The increase of the share of electric buses in public transport operators' fleets is being currently observed. A new decision problem arises: which public transport lines could be operated by electric buses, taking into consideration technical features of this technology, in particular their constraints such as the necessity of installing new charging infrastructure as well as organisational and economic limits of public transport operators.

In this dissertation a mathematical model has been developed, in which a hierarchy of public transport lines, ordered from the most to the least suitable to be operated by electric buses, is obtained based on public transport network, bus schedule and the information about battery charging system. From among numerous characteristics describing public transport lines, four out of them have been chosen. Four decision variables and their weights have also been defined and — afterwards — the definition and the solution of the optimisation task have been proposed. The multi-criteria analysis of the factors influencing the choice of public transport lines which are to be operated by electric buses, enabled their hierarchisation for a selected public transport network.

The model developed in the dissertation has been implemented and verified on the real public transport network basing on the data obtained from the Urban Public Transport Company „PKM Jaworzno" as well as on self-conducted empirical and analytical research. The results state the correctness of the builded model and indicate the possibility of implementation in real conditions to choose the public transport lines which are potentially the most suitable to be operated by electric buses.