

Lecture Notes in Networks and Systems 124

Aleksander Ślaskowski *Editor*

Ecology in Transport: Problems and Solutions

 Springer

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Research on the State of Urban Passenger Mobility in Bulgaria and Prospects for Using Low Carbon Energy for Transport

Velizara Pencheva, Asen Asenov, Ivan Georgiev and Aleksander Śladkowski

Abstract The work investigates the state of and the challenges facing the urban mobility in Bulgaria, related to demographic problems, the operation of urban public transport, the environment and traffic safety. Four stages in the evolution of urban mobility in the country in the second half of the 20th century have been reviewed and a study on the 12 plans for sustainable urban mobility (SUMP) developed by 2019 has been presented. The issues of building a sustainable transport system in the cities through engineering and technological solutions for decarbonisation of transport, shared integrated mobility, as well as servitisation of transport in the cities have been discussed. Some technological solutions for the use of electrical, hybrid and hydrogen fuel cell powered vehicles, including prototypes developed by high school and university student teams have been presented. Research on energy consumption for a river vessel, powered by solar panels has been reported. On the basis of two criteria—for the shortest time and the least harmful emissions, a multicriterial optimisation of public transport travels has been developed. Using Matlab, a programme solving the task of the model defined has been implemented. The input data are the adjacent matrices and the number of pseudorandom Sobolev probing points. Pareto-optimal discrete solutions have been defined, providing the opportunity for the decision-maker to choose one.

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