Inductive Charging Technology for Shuttle Busses

KIT's PRIMOVE Project Focuses on Public Electric Busses in Mannheim – Power Flow Simulation and Optimized Charging Infrastructures

In cooperation with Rhein-Neckar-Verkehr GmbH (RNV), the city of Mannheim, and Bombardier Transportation GmbH, Karlsruhe Institute of Technology (KIT) tests wireless recharging of electric busses used for regular public passenger transportation. The project funded by the Federal Ministry of Transport, Building, and Urban Development (BMVBS) is aimed at demonstrating suitability of the PRIMOVE inductive charging technology for daily passenger transportation.

For a period of twelve months, two inductively charged electric busses will be operated on the regular bus service line 63 in Mannheim and an electric service vehicle is to be applied. Vehicle use will be coordinated by the partners, the project will be managed by RNV GmbH. The scientific project partner is the KIT Institute of Vehicle System Technology (FAST).

In principle, inductive energy is transmitted via two magnetically coupled coils. One of these coils is installed in the road surface at the bus stop, the other is mounted to the vehicle bottom. Variation of magnetic flux induces an electric voltage in the vehicle coil. Thus, energy transmission between both coils is wireless.

KIT research activities under this project focus on simulating power flow in the electric busses and at the inductive charging points. "On this basis, the dimensions of vehicle batteries and the design of the road's charging infrastructure can be adapted optimally," says Professor Peter Gratzfeld from FAST, who manages the project on the part of KIT. Particular attention is paid to the requirements to be met by the supply network. "Large amounts of energy have to be supplied to the charging points within a very short time." In addition, the KIT scientists determine efficiencies. They plan to demonstrate enhanced energy efficiency compared to conventional solutions. After startup of the electric vehicles, the real energy flows will be measured to verify simulation results.

Work also focuses on designing the charging stations in the road such that both electric busses and the electric service vehicle can be

KIT Mobility Systems Center: Solutions for tomorrow's mobility

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charged. Joint use of the same charging infrastructure will facilitate wide use of electric mobility in urban areas. KIT also supports the RNV GmbH in optimizing and designing the workflows at their workshops and provides training for the use of the new electric busses.

With this project, research of the Institute of Vehicle System Technology (FAST) is further advanced in the field of energy management for electrically driven railway and road vehicles. The large scope of mobility research issues at KIT is extended and it is contributed decisively to using electric mobility in everyday life.

The Mobility Systems Center pools KIT activities relating to vehicle technology. Presently, 40 KIT institutes with about 800 employees are working on methodological and technical fundamentals for tomorrow's vehicles. It is their objective to develop concepts, technologies, methods, and processes for future mobility considering the complex interactions of vehicle, driver, traffic, infrastructure, and society.

Karlsruhe Institute of Technology (KIT) is a public corporation according to the legislation of the state of Baden-Württemberg. It fulfills the mission of a university and the mission of a national research center of the Helmholtz Association. KIT focuses on a knowledge triangle that links the tasks of research, teaching, and innovation.

This press release is available on the internet at www.kit.edu.