

Karlsruhe Institute of Technology

Contact: Prof. Dr. Hartmut Schmeck, hartmut.schmeck@kit.edu

iZEUS - intelligent Zero Emission Urban System

SMART GRID & SMART TRAFFIC - SERVICES FOR ELECTRIC MOBILITY

http://izeus.kit.edu

Also visit us at http://meregiomobil.forschung.kit.edu



on the basis of a decision by the German Bundestad



Layout of the **Energy Smart Home Lab** on Campus South of Karlsruhe Institute of Technology

Energy Smart Home Lab

Interdisciplinary Competencies

Eleven chairs of economics, informatics, electrical engineering, and information technology

- Efficient Algorithms and Organic Computing
- Knowledge Management
- Software Design and Quality
- Energy Information Law and Legal Computer Sciences
- Energy Economics
- Information Systems and Management
- Decentralized Systems and Network Services
- Telematics
- Algorithmics (Theoretical Informatics)
- Electric Energy Systems and High Voltage Technology
- Electrical Engineering

Objectives of the Fleet Tests



Intelligent charge management with an elec-tric vehicle capable of feeding electricity back into the grid based on the new ISO/IEC 15118 standard



Optimization of the load profile by smart control of **electric/thermal household appli-ances** and an electric vehicle capable of feeding electricity back into the grid based on an adaptive energy management system (EMS)



Living phases to validate optimized and userfriendly EMS approaches, the focus lying on the exploitation of the user's **energy flexibility** and the execution of **acceptance studies**



Quick charging of electric vehicles without adversely affecting the grid by using additional stationary energy stores



Development of a **charge current converter** to test **power factor correction** and use of an H-bridge for simulation of several (instable) grid situations



Development and supply of an **open e-mo-bility services platform** as an interface and data exchange system for the fleet test



Conceptual design and test of various **value**added mobility services, such as energyefficient routing, finding and reservation of nearest charging stations or visualization of the remaining driving range



Development of a **smart phone app** as an interface between users and the services platform for interactive participation in the field test



Technical and economic analysis of the energy system and sociological research into customer acceptance and user behavior in the fleet test (the focus lying on commercial traffic)

Analysis of legal and economic boundary





Further development of **incentive concepts** for the optimum use of **renewable energies** in connection with **electric mobility**



conditions in terms of data protection, calibration legislation, and law of evidence relating to the demand side management of electric vehicles as well as derivation of **recommendations for action**



KIT - University of the State of Baden-Wuerttemberg and National Research Center of the Helmholtz Association

