

Learning Resources

Part I: Electric Vehicles



Urban Pathways Mobility

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Federal Ministry for the
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based on a decision of the German Bundestag

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Vehicle and Charging Technologies

Charging Technologies

- The three major charging kinds are
 - Conductive Charging i.e. with a cable
 - Inductive Charging i.e. without using a cable
 - Battery Swapping



Conductive Charging

Conductive charging is the most common principle: The electricity is transferred via a cable between the vehicle and the energy outlet. The charging duration depends on the outlet, the battery type and vehicle. Using conventional household outlets results usually in six to eight hours full charging time. Charging stations usually provide stronger currents, so that charging time is reduced. Rapid charging stations, which are operated with direct current (DC stations), can reduce the charging duration to 15 or 30 minutes.



Inductive Charging

Inductive charging uses an electro-magnetic field to recharge the battery without any physical connection. Inductive charging can be installed for instance on road pavement. There are already successful trials of inductive charging, for instance to recharge electric buses at their stops. However, the technology is not widely adopted, yet.



Battery swapping

- Battery swapping means that the empty battery is removed and replaced by a full battery. So the charging actually takes place outside the vehicle. Thereby, within minutes the vehicle can leave the station fully charged. Currently, the battery swapping technology is used mainly in China. Additionally, the US-manufacturer Tesla started to design its vehicles to allow for quick battery replacement.



End of Part I Electric Mobility



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