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## High power charging system for electric buses

Worldwide, diesel buses are almost exclusively used today for urban public transport, yet they burden local environments with carbon dioxide and noise emissions. Since these emissions have to be further reduced in order to meet national and urban climate protection targets, hybrid and electric buses offer a good alternative solution. In order to provide these buses with sufficient power during their scheduled service, a corresponding charging infrastructure has to be installed.

The new Siemens High Power Charger (HPC) offers a fully automatic charging solution for electric buses and electric bus rapid transit (eBRT) systems. A number of buses can be charged per hour with one station. Since all charging electronics are located outside of the vehicles. The charging stations can be installed at stops along the bus line or at the terminals, and ensure that the buses are charged efficiently, quickly and without affecting daily operating punctuality.

Locating the charging system along the bus line reduces vehicle weight and operating costs and imposes no restrictions on passenger capacity compared with conventional buses. Conductive charging is via an integrated pantograph on the bus roof. Digital communication between the vehicle and the charging station ensures rapid coupling and decoupling at the stations and terminal stops and a smooth procedure. The automatic charging operation is handled by an integrated system for monitoring the positions of the pantograph and bus as part of the charging station's safety management system.

The HPC system is offered as a turnkey solution that includes all electrical and structural work and full integration into the existing power grid. The HPC system uses four roof contacts that are located on two parallel lightweight guide rails and

that conduct electricity to the buses' batteries. These low-wear guide rails allow bus manufacturers complete flexibility in their body design and can be used in every type of vehicle, including double-decker buses.

The HPC system has a standard interface and uses the ISO/IEC 15118 communications standard for electromobility and the newly developed EN 4:61851-23 mode. It is thus an open system for charging any type of bus at any location independent of any specific bus manufacturer.

The charging infrastructure offers a remote monitoring feature that can keep track of availability, alarm and operating status at any time. The energy consumption of each vehicle can be calculated, and the autonomy of each vehicle can be recorded and monitored. All incidents that affect the charging system can be registered. The charging system can operate autonomously or be connected to a back office with an OCP protocol using the Internet protocol (IP) with GPRS.

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