Sustainable transportation requires smart grids
ABB solutions for electric mobility

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The future electrical system has to be smart
ABB commitment to smart grids

The increasing need for renewable and more efficient power generation requires a large number of distributed energy sources. Therefore we are moving towards an intelligent grid that can receive power from all sources – centralized or distributed – and deliver reliable supplies to consumers of all kinds. With renewable energy sources, electric vehicles will become the most sustainable form of transportation. More electric vehicles place new demands on the electrical system, in terms of delivery and consumption, but they will also offer significant potential for distributed energy storage. ABB, with its broad portfolio of power technologies, control systems and energy efficient applications, has pioneered many of the technologies needed for the development of an intelligent electrical system.

Renewable power generation
Renewable power generation will pave the way to a lower-carbon future. Large-scale hydro power plants are the traditional source of renewable energy but solar, wind and other sustainable sources are more widely dispersed, intermittent and less predictable and their integration into the electrical system requires more intelligent management of power flows. The future electrical system must meet this challenge. ABB currently offers a full, state-of-the art portfolio to optimize every step in the energy value chain, from the production of electricity, through transmission and distribution, to efficient consumption by the end user.

A smart grid
The future electrical system must meet the increasing demand for electrical energy in a reliable and efficient way, from a growing base of renewable resources. The system will be able to detect and react automatically to network disturbances and changes in supply and demand, re-establishing balance and maintaining the required stability. It must also accommodate customer-response management systems and energy-trading facilities that allow further optimization of the system’s performance. ABB currently offers a full, state-of-the-art portfolio to build a smarter grid.

Smart transportation
Supplying the appropriate form of electricity to electric vehicles is a challenge the future electrical system must overcome. Smart grids will need to provide charging facilities for electric vehicles, and also make use of the enormous storage capacity that will be available in the form of car batteries. To achieve the full CO2-saving potential, smart grids and smart transport solutions must be implemented simultaneously.

As leading power and automation technology group, ABB feels a strong commitment to e-mobility. A commitment towards utilities and infrastructure providers to offer integrated smart charging solutions and to prepare the grid for the challenges e-mobility brings; a commitment towards the EV (Electric Vehicle) driver to enable safe recharging at the required speed and to prevent battery depletion; a commitment towards the environment to make individual mobility more sustainable and allow for e-mobility powered by renewables, all integrated in a reliable smart grid.

Residential charging
Home chargers deliver efficient, low power vehicle charging that can refill a battery during the night, reaching full capacity before morning. Charging overnight ensures that the load on the grid is low, and the car is refilled economically using low cost night-time power. A range of home chargers are available to suit the needs of different homes – indoor, outdoor, wall mounted - and all incorporate the safety systems you can expect of any home appliance.

Public charging
Public chargers are semi-fast charging solutions that can charge a battery in a few hours while the driver is at work, or be used to keep the car charged up during everyday activities such as shopping or driving out. These charging poles will be found throughout the town or city at company parking, public buildings, stores and large car parks. These charging poles are built strong and safe to fit the requirements of a public space. In most cases the consumer will pay for the electricity used in the charging, so the charging pole will include an authentication and/or payment system.

Ultrafast charging
Future ultrafast chargers will allow a ‘fuel stop’-equivalent for EVs, charging the car in the shortest possible time. Combined with the latest battery technologies, this could allow a full recharge in less than five minutes. These chargers will be installed in highway rest areas and convenient city refueling points. Grid energy management and power quality are provided by state-of-the-art power electronics, smart grid interfacing and integrated energy storage to manage the variations in power production. The vehicle connections will be based on industry standards, ensuring compatibility with all vehicles.