USEFUL BACKGROUND INFORMATION TO SUPPORT DC CHARGER OPENING AT RCS

How fast is rapid charging?
Away-from-home DC rapid charging complements slower AC charging at home. DC rapid charging is a technology that allows for the charging of an electric vehicle (EV) in 15-30 minutes to approximately 80 percent of the battery capacity.

Which cars are able to rapid charge?
There are already several rapid-charge capable cars on the market, including the Nissan Leaf, Mitsubishi iMiEV, Peugeot iOn and Citroen C-Zero. Many more rapid-charge capable cars are expected to come to the market in the coming years.

What is the benefit of rapid charging?
The typical charge time for an electric vehicle is 6-10 hours. With rapid charging this can be reduced to 15-30 minutes. A field study by TEPCO (Tokyo Electric Power Company) in the period 2007-2009 has clearly shown that rapid charging is a key instrument in the successful rollout of electric vehicles.

The field study, involving with several hundred electric vehicles, showed that without rapid charging people are initially reluctant to use electric vehicles because of concerns about the limited range of electric vehicles, also referred to as “range anxiety”. In the second year of the study several rapid chargers were installed and the effect on user behaviour was massive: people started using the EV and drove 5 times longer distances. On top of that, rapid charging is the ideal solution for professional fleet owners, such as EV taxi operators. They have to keep their cars operational throughout the day and cannot afford to wait hours for a battery to charge. Rapid charging makes their business case work.

AC or DC charging?
AC (Alternating Current) charging is typically done with a smaller charger inside the vehicle and is predominantly intended for home/overnight charging. When vehicles are being used regularly, rapid charging is often the best solution as it allows EVs to quickly recharge and keep driving. However, rapid charging requires bigger chargers, which makes it more practical to place the charger outside of the vehicle. DC charging is based on an off-board charger that supplies DC (Direct Current) to the vehicle's battery. DC off-board chargers allow for much higher capacity charges and can be used to service a fleet of vehicles instead of just one. DC charging has been used for a long time, for example to charge electric forklift trucks in warehouses. The technology has been optimised to allow rapid-charging of electric vehicles.
What do consumers have to pay for rapid-charging of their EV?

This depends on the business model chosen by the B2C service operator. ABB's rapid chargers are supported by a future-proof connectivity suite. The connectivity features, such as remote maintenance and automatic software updates, help service operators run their network more efficiently. The connectivity suite is designed to support different business models and pricing and payment methods, which are typically selected by the operator.

In the case of Nottinghamshire-based printer RCS, operator of the UK’s first privately owned DC charger, the charger is available to anyone who wants to drive up and use it. RCS may install a payment system, using a credit-card swipe at a later date, but for now there is no cost to using the charger.

What is the connection standard for rapid charging?

There are several rapid-charging standards: a Japanese, European and U.S. standard. The Japanese standard is called CHAdeMO and is supported by several major car OEMs. CHAdeMO vehicles are already available in Europe. Cars that are compliant with the EU and U.S. standards will follow shortly. Any charging infrastructure therefore needs to be capable of supporting all of these standards. The situation can be compared with the current petrol market, in which diesel, petrol and LPG have coexisted for years.

What does multi-protocol mean?

To truly drive growth of the EV market, ABB firmly believes that its Terra chargers should be able to service all cars in the same network, regardless of the connection standard they use. ABB's future-proof connectivity solutions are designed to support all existing and future connection standards and communication protocols.

What is Power-Routing?

Power-Routing is ABB's technology platform of web connected chargers. The main purpose of power routing is to dynamically optimise the power flow from the grid to a number of electric vehicles. The Terra chargers can be connected to all kinds of web services, scheduling tools, payment (POS) systems, navigation tools and demand-response software.

ABB's patented Power-Routing system ensures that power is transferred in the most efficient way, according to the preferences in each specific situation while taking into account the health of battery and power limitations of the electricity grid.

Is DC battery charging safe?

All of ABB's Terra chargers are CHAdeMO certified. CHAdeMO chargers are based on extreme safety measures. Before the start of charging, the charger conducts double and triple checks to make sure that the connection is perfectly done and cables and connectors are completely insulated. Charging only gets started after all those checking procedures have been completed and safety has been confirmed. Furthermore, ABB's Terra chargers are CE certified, which demonstrates compliance with the relevant European Union safety directives. Terra systems are fully compliant with the requirements of the electromagnetic compatibility and low voltage directives, which were designed to ensure safety of electrical equipment.
ABB has extensive experience in installing chargers at various locations and some locations, such as petrol stations, involve stricter safety measures (in the case of petrol stations, it's because of the fuel storage).

**How does a rapid-charging station work?**

The charging posts have an English-language display, which guides the user through the charging process. The charging stations only have three buttons and are easy to operate. Payment depends on the method chosen by the operator. In many cases, consumers need to have a (RFID) card to be authenticated and authorised, after which the charger will be released for use. In the case of RCS, EV owners can just drive up and use the charger as there's no payment system currently in place.