E-mobility vision and role of wireless charging

July 1, 2020
AVERE. Webinar wireless charging
Copper Alliance and e-mobility

- European Copper Institute, regional office of Copper Alliance, global association Copper producers (miners, refiners, fabricators).
- Missions: material stewardship, industry reputation and Copper applications.
- Regarding Copper applications, working on regulations and standards.

- On average, a battery electric vehicle (BEV) uses 3 times more Copper than a conventional one, around half in the battery pack (0.6 kg/kWh).
- Added to the demand from charging infrastructure and renewable generation to feed them.
Climate emergency and clean road transport

- **Road transport, sector with the highest decarbonization potential:**
  - Road transport accounts for 20% EU CO$_2$ emissions (2015).
  - BEV emits 3 times less CO$_2$ than combustion (well-to-wheel, 2015 EU mix).
  - EU average ownership duration: 6 years (a rotation 3-5 times faster than heating & cooling assets).

- **Besides CO$_2$ and air quality, what makes BEV the best available technology is:**
  - Between 2.5 and 5 times more energy efficient than other clean technologies.
  - Already with a lower total cost of ownership than conventional in most cases in Europe.
  - Grid services (V1G and V2G) to integrate renewable generation.
Passenger car. Use case

- Last middle segment models with 400km range, suffice for everyday use. Overnight charging at low power (3.7kW to recharge on average in less than 3 hours the energy used during the day).

- With a high renewable mix, our vision is to keep the car always connected while parked, available anytime to take or provide electricity (V2X).

- e-Mobility Service Provider / Aggregator will manage state of charge to provide a great user experience, using artificial intelligence and authorized personal data.

- During long journeys, 150kW+ chargers to shorten the stop. At destination, low power again.
Convincing consumers through regulation on charging infrastructure

- With the CO$_2$ standard regulation in place, now it’s time to convince consumers.

- A key aspect is charging: from “more-convenient-to-use” to just “forget-about-it”.

- Our main policy asks:
  - Long journeys: at least 150 kW every 60km along TEN-T Core Network.
  - Urban, parking in buildings: Right to plug (just to inform community as unique requirement before installing).
  - Urban, parking on-street: Tenders already granted in 2025 for 20% of public parking spaces, with wireless charging infrastructure for cars and light commercial vehicles.
Urban wireless charging will engage users and cities

- In Europe, two-thirds cars park overnight on the street or public car parks.
- Cities will prefer an invisible charging infrastructure (underground equipment).
- Drivers will love Park & Forget (about cables, apps/tokens and even charging):
  - The driver parks and aligns the vehicle (some will do by themselves).
  - Vehicle and charge point start authentication and data transfer (e-roaming).
  - If everything is OK, the charging session starts.
  - The session finishes when planned or when the driver unlocks the vehicle.
  - In case of detection of a living or foreign object, the session stops and a message is sent to the user.

- Also suitable for car-sharing and autonomous vehicles.
Wireless charging is ready

- 7.4 kW for cars and light commercial vehicles (gross vehicle weight < 2,500 kg).
- Same efficiency range than conductive in the market (battery - charge points mains).
- Cost of additional equipment (at mass production): around 500€ (vehicle) and 2,000€ (charge point).
- Wireless is already included in vehicle platforms of major OEMs (as VW, Daimler, Toyota).
- Available retrofit for vehicles and charge points.
- Vehicle to grid (V2G) also possible with wireless.
All related standards will be available before mid 2021

- In China just published. In US new SAE J2954 in 2020. In Europe:

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Wireless charging strategy

- It seems that car manufacturers look at wireless as a premium optional feature or for commercial fleets (private charging infrastructure).

- However wireless charging is a powerful driver to accelerate EV uptake.

- Cities have the key to unlock the chicken-egg situation (who starts installing wireless: car manufacturers or charge point operators) and synchronize the market.

- Steps:
  - More cities running pilots to confirm the promise.
  - To share experiences with other cities.
  - To include wireless as a requirement for future tenders (before 2025).
Wireless charging pilots in progress

- 2016 Rotterdam. Technology test, lead by Engie.
- 2019 Cologne. Taxi rank, lead by University of Duisburg Essen.
- 2020 Oslo. Taxi rank, lead by Fortum.
- 2020 Nottingham. Taxi rank, lead by Cenex.
- 2020 London. Residential parking, lead by Connected Kerb.
- 2020 London, Milton Keynes and towns in Buckinghamshire. Residential parking, lead by Char.gy

Currently looking for cities interested on running wireless charging pilots.

Please contact me at diego.carvajal@copperalliance.eu
Thank you

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