Dynamic Charging Platoon (DCP) Technology

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Dynamic Charging Platoon technology is a number of electric vehicles that are traveling automatically together at short distances in (Road Train formation) and electrically and electronically connected with each other with plug in retractable extendable charging cable and receiving electrical energy from Power Bank or Power Generator Truck as a lead vehicle of the platoon on the go. (Fig 1 and 2).

Dynamic Charging Platoon DC power sharing technology allows the system to charge the fleet of the electric vehicles inside the Platoon simultaneously.

Different types of Electric Vehicle can receive a charge in this method, such as Car Truck, Bus or HGV.

Joining Hub to Hub DCP

1. EVs owners at the beginning of the highway, entering to the Platooning terminal. (Fig 3)

2. After choosing the Platoon that goes to their destination and getting behind other vehicles on that convoy the terminal staff connect the EVs, plugin cables to other Electric Vehicles in front of it and in the end to the Power Bank Truck.

3. After automatically checking the V2V Power and Communication Network Connection, Power Source Truck driver undertake the control of all vehicles and leave the terminal under Platoon formation, to the high-capacity dedicated Platoon lane on highway.

Leaving the DCP

1. After arriving at the destination Platoon Terminal, The terminal staff disconnect the EVs, cables from each other and from the Power Source Truck, and EVs Drivers then take manual control of the vehicle on non-platoon roadways to reach their final destination

Benefits:

1. Providing on-demand power transfer to any type of EVs, with any different energy demand even provide higher levels of power suitable for HGV, whilst travelling at low and normal traffic speeds or when traffic completely stop, power used directly to drive the propulsion unit and also can be stored in batteries for later use (i.e. when not travelling along an dedicated DCP Lane).

2. No need to any road or roadside equipment installation, includes transformers, or grid connection, and no need for installation of Inductive (wireless pad) embedded in the road or Conductive rail (in-road) or (road side) or overhead line, and also this method not impact the pavement structure and routine pavement maintenance activity.

3. DCP system can be easily inspected, as most components are visible and accessible.

4. DCP is so safe, and no risks for road users (regarding electrocution, electromagnetic radiation, vulnerable road users and so on) and it also has no visual impact.

5. Platooning increases fuel efficiency of systems by reduction in aerodynamic drag of vehicles (especially for freight industry). (Fig 4) And it translated to significant benefits for GHG, and local air quality, it also improved on-road safety (i.e., fewer collisions and fatalities), additional road capacity (i.e., less gap between vehicles, better physical road us.

6. DCP is fastest and most affordable method for road electrification, in this method there is no need for huge upfront investment for installation of ERS on road or roadside and investment can increases step by step according annual global electric vehicle (EV) adoption.

7. For drivers, DCP could completely cut the charging related time and ease tediousness of long shifts and allow drivers to engage in other tasks during driving and it can cut significantly the labor costs.

DCP Benefits for fleet operators:

1. The cost of the driver is fully or partially eliminated.

2. Fuel cost savings from Platooning.

3. Fuel cost savings from Electrification.

4. Maintenance cost is reduced due to less wear and tear (the result of better driving).

5. Less unplanned downtime (the result of fewer accidents).

6. The insurance cost is expected to fall in line with the lower probability of accidents.

DCP implementation total cost for 1 Km per lane:

We estimate total cost of implementation of DCP for Heavy Vehicles for 1 Km per lane for 2025 with %4 EVs adoption is: €20,000 and for 2050 with %30 EVs adoption is: €100,000