



INNOVATION FUND

Driving clean innovative technologies towards the market

DrossOne V2G Parking: Large-scale vehicle-to-grid system with integrated stationary storage

The Innovation Fund is 100% funded by the EU Emissions Trading System



Project summary

The DrossOne V2G Parking project will demonstrate the feasibility of a large-scale, centralized vehicle-to-grid (V2G) charging system by using the stationary storage associated with the electric vehicles (EV) in the car park of their manufacturer (before being shipped to car dealerships) and a stationary storage unit based on second-life batteries. The project will also provide fast reserve ancillary services to the grid operator (such as balancing, frequency and power regulation), as well as real time services, by using a system with 280 bidirectional fast chargers.

COORDINATOR

Free2Move E Solutions

LOCATION

Mirafiori, Turin - Italy

SECTOR

Intra-day electricity storage

AMOUNT OF INNOVATION FUND GRANT

EUR 1 643 000

RELEVANT COSTS

EUR 7 497 000

STARTING DATE

01 May 2021

PLANNED DATE OF ENTRY INTO OPERATION

Q1 2023



A first-of-a-kind stable system for ancillary services

The project is the first commercial large-scale centralized bi-directional V2G system in the world. Such an innovation is based on developments in the hardware component - i.e. the addition of a direct current-direct current (DC-DC) converter. The converter will allow different types of EVs, including high-voltage EV battery packs from commercial vehicles, trucks and buses with different battery State of Charge (SoC) to be charged and discharged. In the pilot phase, only the same type of vehicle could be connected due to the requirement of having to equalize the voltage of batteries before interaction with the grid.

Other key innovations are also associated with the project. Firstly, a new aggregating software platform that emulates and controls the entire fleet as one centralised 'energy storage resource' with a single interface to the grid.

Secondly, an innovative business model that generates value from the unused storage capacity of parked EVs, by offering grid stability services to the Italian transmission system operator (TSO).

Supporting the transition by reducing the need for peaking fossil fuel-based power plants

Whilst to date, TSOs have relied on thermal plants to provide flexibility and grid-balancing services, DrossOne V2G Parking will deliver a nominal capacity of 25 MW ultra-fast reserve services between 2023 and 2027. Indeed, the V2G system can guarantee a maximum

dispatchable power of 30.8 MW for ancillary services, for which the project configuration includes a stationary storage system (second-life batteries).

EV fleets can provide a myriad of services to the distribution and transmission grid, such as frequency regulation (ultra-rapid reserve service, primary, secondary, tertiary reserve), voltage regulation, balancing services as well as behind the meter optimization (increased self-consumption, load shifting, peak shaving, etc.). Whilst secondary reserve and voltage regulation are not yet regulated on the Italian market, the V2G platform will initially deliver ultra-rapid reserve and real-time services such as tertiary reserve (R3), balancing, participation in intra-day trading and portfolio balancing.

As a result of their rapid regulation possibilities (<200 ms), energy storage and EV fleets can contribute to a more sustainable carbon neutral future, as they will reduce the need for peaking fossil fuel-based power plants to deliver ancillary grid services and therefore reduce the GHG emissions linked to these power plants.

A technology that can be replicated beyond the regional economy and sector

The realisation of the project will represent a major step up in the technology's demonstrated readiness, built directly in an operational environment at pre-commercial scale. It will add significant expertise on how to expand the project site, adapt the technology and cooperate with multiple regional actors for other sites.

The potential market opportunities for the expansion and replicability of the envisaged centralised bi-directional charging system presented by this project are already tangible. A dramatic increase in the availability of pooled EV batteries is expected in the medium term. Such a V2G project can be replicated under different use cases either in the B2B, B2C or B2T domains (for instance industrial settings, large commercial areas, service providers, community grids, airports, etc.).