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D3.1: Use-case driven comparison of smart charging technologies and Electric regulation for V2G

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1. Executive Summary

The overall project objective is to optimize the entire charging chain - from energy provision to the end user - to create a clear benefit for all stakeholders. Therefore, a ubiquitous on-demand charging solution based on an optimized charging network considering human, technical and economic factors along the entire charging chain shall be developed.

The investigation of the user behaviour as well as the analysis of the energy system and grid will form the basis from a research side, to predict the future behaviour of EV owners and fleet operators as well as possible shortcomings in the electric grid and energy system.

The development of advanced charging technologies and control mechanisms as well as advanced charging and sector coupling concepts, will form the basis for the virtual and real evaluations/demonstrations conducted in 4 different European countries (Belgium, Germany, Italy, Portugal).

In parallel a smart charging simulation environment (digital twin of the charging chain with a holistic simulation environment with multilevel component models and representative information flow between all agents) will be built up. This digital twin will incorporate the results of the demonstration actions and enable an upscaling to show the impact of these technologies.

To ensure the interoperability and the optimization along this charging chain, the consortium comprises all relevant partners/stakeholders (energy providers, grid operators, charge point operator, electric vehicle (EV) equipment providers as well a vehicle manufacturer).

Keywords: Smart charging, V2X&V1G functionalities, Grid (DSO, aggregator), Smart charging entities (CP, Smart Homes, EVSE's).