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D3.3: Development of UMEI for V2X

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1. Executive Summary

This deliverable describes the development and adaptation of the Universal Market Enabling Interface (UMEI) to support smart charging and Vehicle-to-Everything (V2X) use cases within the XL-Connect project. The work focuses specifically on the interaction between the Distribution System Operator (DSO) E-REDES and the Eavy Charging Platform, acting as Charging Point Operator (CPO). The objective is to establish a standardised, interoperable communication layer enabling the DSO to request, activate, and validate flexibility services from electric vehicle charging infrastructures in a manner that is technology-agnostic and scalable.

UMEI, originally developed under the H2020 EUniversal project[1], provides a modular and decentralised set of APIs designed to facilitate the exchange of flexibility-related information between DSOs and market participants. In XL-Connect, this framework is extended to address the specific functional requirements associated with smart charging, congestion-driven load management, and V2G-based flexibility provision. These extensions preserve the core architectural principles of UMEI while enabling its application to the emerging needs of the EV charging ecosystem identified in WP3.

In line with the project's interoperability objectives, the deliverable distinguishes clearly between system-level interactions governed by UMEI and device-level communication standards (OCPP, ISO 15118, IEC 61851) addressed in other parts of the project. UMEI is positioned exclusively between the DSO and the CPO backend, ensuring a clean separation of responsibilities and avoiding any overlap with charger or vehicle communication protocols. This layered approach is consistent with the technical analyses presented in D3.1, D3.2 and D3.4.

For the Portuguese demonstration, E-REDES will not interface with production IT systems. Instead, all grid data required for the demonstration – including flexibility needs, grid node constraints, measurements, and topological information – will be generated through controlled simulation environments. This strategy ensures compliance with internal cybersecurity and operational constraints and allows the project to perform a rigorous assessment of UMEI message flows and system behaviour under representative, but non-operational, conditions. The demonstration therefore focuses on validating API correctness, semantic consistency, authentication mechanisms, and bidirectional information flows, rather than real-time grid operation.

The document defines the mapping between UMEI messages and the operational actions enforced by the CPO platform, including power limitation, modulation of charging demand, and (where infrastructure permits) bidirectional power transfer. It

[1] The Universal Market Enabling Interface (UMEI) was originally co-developed within the H2020 EUniversal project (Grant Agreement No. 864334). In line with the Joint Ownership Agreement signed on 9 July 2024, E-REDES acknowledges NODES AS, N-SIDE S.A., and Centrica Business Solutions Belgium NV as co-proprietors and co-developers of the UMEI interface. These partners jointly contributed to the design, development and open-source release of UMEI under the Apache 2.0 license, and shall be credited accordingly in all dissemination activities referring to the UMEI framework or any derived versions, as stipulated in Article 3 of the Agreement.

also specifies the expected reporting structures that enable the DSO to assess flexibility delivery and confirm compliance with issued instructions.

Finally, the deliverable outlines the validation plan to be executed in WP5, ensuring that the implemented UMEI extensions meet the interoperability, performance, and reliability requirements of XL-Connect. The work reported here provides a key architectural foundation for the integration of V2X-capable charging technologies into distribution system operation and contributes directly to the project's broader objective of enabling a more flexible and resilient charging ecosystem across Europe.