e-Newsletter #2
July 2026

Introduction

The European Commission strives to make Europe the first climate-neutral continent by 2050. To support this goal, a competitive and sustainable transport system needs to be built. Electrical Vehicles (EVs) are the core of the European Commission's transition plan for the transport sector towards electromobility. The successful integration of EVs requires the deployment of an extensive infrastructure for EV charging systems (EVCSs) that covers the overall charging needs of consumers. Improving EVCSs across Europe heavily relies on harmonised legislation and developing the underlying metrological infrastructure. Specifically, accurate measurement facilities for total net energy transfer and charging losses are needed. Additionally, the charging process needs to be established without negatively affecting the power quality of public electricity networks. These developments will support the Directive 2014/94/EU of the European Parliament and of the Council of 22 October 2014 on the deployment of alternative fuels infrastructure and the United nation's Sustainable goal 7 on affordable, reliable, sustainable and modern energy for all.

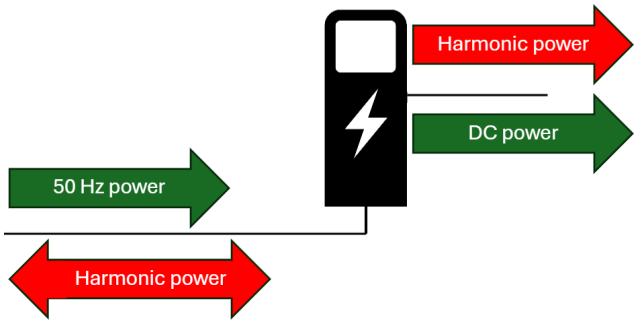
Consortium members during the midterm project meeting of the project on 3-4 December 2025 at CMI in Prague.

The project goals

This three-year project, that started in July 2024, will tackle the challenges of power quality effects on and resulting from EVCSs, and evaluate the associated losses and reliability of metering under actual on-site conditions. The project aims to cover several charging modes, such as AC and DC charging at low and high power, smart, and bi-directional charging. The project will support the industry needs by developing a metrology infrastructure for traceable testing of EV charging systems. The project aims to develop operational reference test benches for the characterization of metering accuracy and the energy transfer efficiency, as well as for the conducted emissions of AC and DC EVCSs. In addition, calibration services will be established and offered by national metrology institutes for the calibration of the reference test benches specifically for AC and DC EVCSs. The project will also develop a database of measured grid distortions and grid impedances close to EVCSs sites to ensure grid security is not compromised. Test methodologies and protocols will be developed that allow the on-site verification of EVCS meter accuracy.

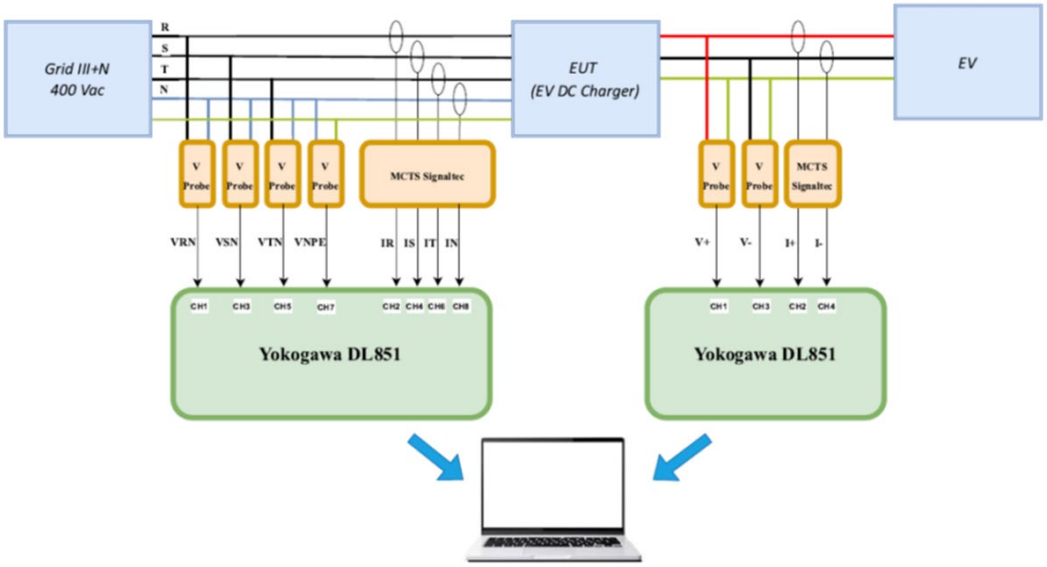
Technical progress

The project has moved from initial planning to the implementation and application of measurement methods, test setups, and field campaigns for EVCSs.



Efficiency definition: In a charging station, harmonic power is turned to heat and should likely NOT be considered as delivered power in efficiency calculations!

Traceable methods to measure grid disturbances and grid impedance up to 150 kHz have been developed and validated, ensuring consistent and reliable measurements across different partners. Dedicated measurement systems combining broadband sensors and advanced data acquisition instrumentation have been verified in the laboratory, including calibration against reference standards. The methods and associated uncertainty considerations have been described in a dedicated "Report on the developed measurement methods for determining local grid disturbances and local grid impedances up to 150 kHz", which is publicly available on the project website and serves as a reference for all ongoing and future measurement activities.



CIRCE institute's grid disturbance measurement circuit diagram.

Using these methods, measurement campaigns have been carried out at EV charging sites in Italy, Spain, Sweden, the UK, and the Netherlands. Data have already been collected, processed, and are currently being analysed. The measurements cover a wide range of charging scenarios, from conventional AC charging to high-power DC installations, including sites with multiple chargers operating simultaneously. The resulting datasets capture realistic operating conditions and provide valuable insight into grid disturbances and impedance behaviour in practice. Common data processing approaches are applied to ensure comparability across all locations.

RISE institute & UPV/EHU university's grid impedance and EVCS disturbance measurement team at an EV charging station in Sweden.

The Universities of Strathclyde and UPV/EHU during a measurement campaign at PNDC (UK) to assess grid impedance and disturbances associated with EV charging stations.

In parallel, laboratory test benches have been prepared to operate under realistic, non-ideal supply conditions and are being extended to support smart charging and bidirectional operation. Reference and industrial-grade test benches are being developed, covering a wide range of voltages, currents, and power levels. These systems enable detailed evaluation of metering accuracy, energy efficiency, and conducted emissions under controlled conditions.

Calibration of the EV charging station power AC reference measurement setup at LNE´s laboratories.

Work has also started on translating laboratory methods into practical on-site verification procedures. Prototype test setups have been assembled and initial testing carried out using representative loads. These activities are laying the groundwork for efficient, real-world verification of EVCS energy metering in future project stages.

CMI institute on-site verification of DC metering accuracy in EVCSs.

Events

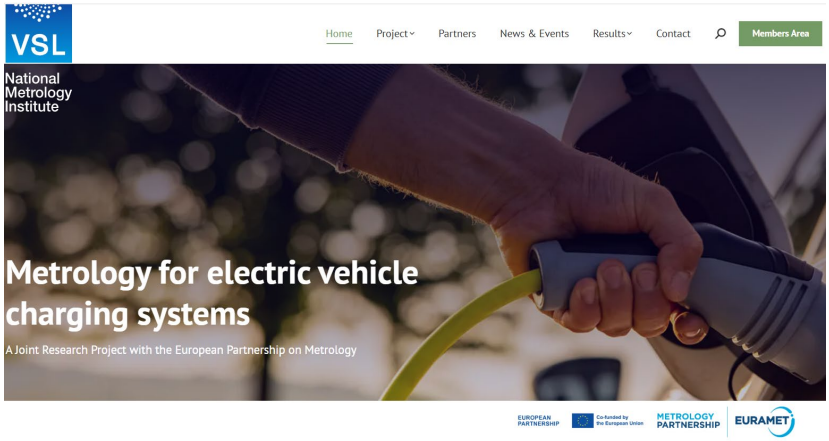
A special session on “Metrology for Low-Frequency EM Disturbances in EV Charging Systems” has been arranged by the project consortium at the **EMC Europe 2026 conference in Prague, 31 Aug – 3 Sept**. Four papers will be presented on the project’s results.

ICHQP 2026
22nd International Conference on Harmonics and Quality of Power
August 31 - September 3, 2026
Dresden, Germany

A tutorial on “Electric Vehicle Charging Systems: Power Quality, Metering Accuracy, and On-Site Verification” will be provided at the **International Conference on Harmonics and Quality of Power (ICHQP 2026) in Dresden, 31 Aug – 3 Sept**.

An online stakeholder workshop was organised to discuss the project aims on 4 November 2024, with more than 100 attendees covering a wide range of stakeholders including EVCS manufacturers, grid operators, and standardisation bodies. A follow-up workshop to present and discuss preliminary results is planned in the autumn of 2026.

Further reading



For downloading the project scientific publications, please visit the Met4EVC Zenodo community. You can read about the participating organisations, the objectives and the expected outcomes and impact by downloading the Project publishable summary. To be informed about the latest project updates you can visit the project's website: 23IND06 Met4EVCS.

Traceable methods to measure grid disturbances and grid impedance up to 150 kHz for consistent and reliable measurements using measurement systems having combining broadband sensors and advanced data acquisition instrumentation including calibration against reference standards have been described in the "Report on the developed measurement methods for determining local grid disturbances and local grid impedances up to 150 kHz".

The 23NRM06 Met4EVCS project has received funding from the European Partnership on Metrology, co-financed from the European Union's Horizon Europe Research and Innovation Programme and by the Participating States. Click here for more information published at Euramet website: The gateway to Europe's integrated metrology community. This project aligns with the Strategic research agenda of EURAMET's European Metrology Network on Smart Electricity Grids (EMN-SEG).

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#Measurement Science, #Metrology, #EUfunded, #EUPartnership, #Electric Vehicles, #EV Supply Equipment

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EUROPEAN PARTNERSHIP

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The project has received funding from the European Partnership on Metrology, co-financed from the European Union's Horizon Europe Research and Innovation Programme and by the Participating States.

METROLOGY PARTNERSHIP

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