
Upravljanje razpršenih sistemov za shranjevanje energije na osnovi električno polnilnih akumulatorjev vozil - 1. del: Definicije, zahteve in primeri uporabe (IEC 63382-1:2025)

Management of distributed energy storage systems based on electrically chargeable vehicle batteries - Part 1: Use cases and architectures (IEC 63382-1:2025)

Management von verteilten Energiespeichersystemen auf der Basis von elektrisch aufladbaren Fahrzeugen (ECV-DESS) - Teil 1: Definitionen, Anforderungen und Anwendungsfälle (IEC 63382-1:2025)

Gestion des systèmes de stockage d'énergie décentralisés installés sur les batteries de véhicules électriques rechargeables - Partie 1: Cas d'utilisation et architectures (IEC 63382-1:2025)

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Management of distributed energy storage systems based on
electrically chargeable vehicle batteries - Part 1: Use cases and
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(IEC 63382-1:2025)

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der Basis von elektrisch aufladbaren Fahrzeugen (ECV-
DESS) - Teil 1: Definitionen, Anforderungen und
Anwendungsfälle
(IEC 63382-1:2025)

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EN IEC 63382-1:2026 (E)**European foreword**

The text of document 69/1073/FDIS, future edition 1 of IEC 63382-1, prepared by TC 69 "Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 63382-1:2026.

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In the official version, for Bibliography, the following notes have to be added for the standard indicated:

IEC 60870-5-104	NOTE	Approved as EN 60870-5-104
IEC 61850 series	NOTE	Approved as EN 61850 series
IEC 61850-7-420:2021	NOTE	Approved as EN IEC 61850-7-420:2021 (not modified)
IEC 62056 series	NOTE	Approved as EN 62056 series
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IEC 62443 series	NOTE	Approved as EN IEC 62443 series
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IEC 63119-1:2019	NOTE	Approved as EN IEC 63119-1:2019 (not modified)
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IEC 63584	NOTE	Approved as EN IEC 63584
ISO 15118-1:2019	NOTE	Approved as EN ISO 15118-1:2019 (not modified)

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cencenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 62351-3	-	Power systems management and associated information exchange - Data and communications security - Part 3: Communication network and system security - Profiles including TCP/IP	EN IEC 62351-3	-
IEC 62351-9	-	Power systems management and associated information exchange - Data and communications security - Part 9: Cyber security key management for power system equipment	EN IEC 62351-9	-
ISO 15118	series	Road vehicles - Vehicle to grid communication interface	EN ISO 15118	series

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IEC 63382-1

Edition 1.0 2025-11

INTERNATIONAL STANDARD

**Management of distributed energy storage systems based on electrically
chargeable vehicle batteries -
Part 1: Use cases and architectures**

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Management of distributed energy storage systems
based on electrically chargeable vehicle batteries -
Part 1: Use cases and architectures**

FOREWORD

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IEC 63382-1 has been prepared by IEC technical committee 69: Electrical power/energy transfer systems for electrically propelled road vehicles and industrial trucks. It is an International Standard.

The text of this International Standard is based on the following documents:

Draft	Report on voting
69/1073/FDIS	69/1093/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

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This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 63382 series, published under the general title *Management of distributed energy storage systems based on electrically chargeable vehicle batteries*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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INTRODUCTION

The high share of renewable energy sources (RES) connected to the grid, because of their intermittent and not-programmable nature, imposes a change in the management of the electrical network.

The replacement of conventional generators with the RES static power converters reduces the total rotating inertia connected to grid.

An increasing number of distributed energy resources (DERs), consisting in small generators, energy storage systems and controllable loads, is connected to the distribution networks, which become "active", that is, capable not only of absorbing energy from the transmission network, but also of supplying energy in the opposite direction.

The transition to an "All Electric Society", which involves the use of electric energy in the transportation (e-mobility) and in the building heating and conditioning systems (heat pumps), increases the demand of electricity and imposes additional stress on the existing electrical power systems.

Power unbalances, network congestions and voltage fluctuations may happen more frequently.

A more suitable way to manage the electrical network and to dispatch the energy resources is unavoidable to meet these changes.

The energy flexibility, which is the ability to adjust power generation and/or demand, represents a solution and it is applicable to DERs.

The growth of electric vehicle (EV) circulation, associated with the expansion of the EV charging infrastructure and the advent of smart charging (V1G) and vehicle to grid (V2G) technologies are creating a large number of DERs in the mobility sector.

In fact, the pair EVSE-EV can be considered as a DER, since it can operate as a generator in V2G mode and as a controllable load in smart charging (V1G). Furthermore, the EV battery is a mobile energy storage system.

Distributed energy storage systems (DESS), based on electrically chargeable vehicle batteries (ECV-DESS), can be created by aggregating several EVs connected to the charging infrastructure and acting as DERs.

The ECV-DESS may provide energy flexibility services contributing to an improvement of the stable and reliable operation of the electrical network. See Annex C.

The power balancing will result from the coordinated efforts of conventional power systems in combination with the EV charging infrastructure, other DERs, microgrids and virtual power plants (VPPs), which may include DESS.

The energy flexibility services are aimed at achieving:

- power balancing;
- network congestion management;
- voltage control.

The specific nature of EV, which is mobile and capable to connect to the charging infrastructure in different locations, with different charging modes, sets new requirements on the control and communication interfaces.

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The EV charging Stations may have different configurations and modes of operations.

They can operate by AC or DC charge, they can charge and discharge, with mono or bidirectional power transfer between EV and EVSE.

They can be composed by one or more EVSEs in one EV-charging station. In presence of multiple EVSEs, they can be arranged in AC or DC bus configurations.

Finally, the bidirectional inverter can be installed on-board of vehicle or off-board.

Appropriate standards are essential to manage the complexity of these systems.

These standards will sustain the growth of EV circulation, rule the V1G and V2G services, support the aggregation of multiple EV DERs, define how to specify the requirements between the aggregator /flexibility operator (FO) and the EV charging station operators.

NOTE Aggregator and flexibility operator have the same meaning in the context of this document.

The presence in the e-mobility market of products and services offered by several vendors calls for interoperability and interchangeability between solutions provided by different suppliers.

Furthermore, the standards have to meet the requirements of cybersecurity and privacy for a proper operation of ECV DESSs.

The IEC 63382 series is intended to cover all these aspects and to fill gaps in existing standards concerning communication between the aggregator/FO and the EV charging station backend system.

It is aimed at completing the communication and control chain which connect the EV with the charging infrastructure (EVSE and charging stations) and with the aggregator/FO at an upper hierarchical level. In this respect it represents a complement of the standardization work made on ISO 15118 series and IEC 63110 series.

The IEC 63382 series consists of three parts, each dedicated to a specific subject:

IEC 63382-1 is dedicated to EV charging station configurations, communication architecture, requirements, both functional and non-functional, use cases, with actors, roles and domains descriptions. Reference is made to CENELEC's SGAM (Smart Grid Architecture Model) and to UML model.

IEC 63382-2 is dedicated to communication protocol specifications. It includes layered model according to OSI model from ISO, list of requirements, data models, object model, messages and message formats, datatypes, message sequences, and security aspects.

IEC 63382-3 is dedicated to conformance testing. The tests will cover the interface between Aggregator/FO and the CS Backend system.

It includes test setup, test suite, test cases designed to verify behaviour of system with respect to specifications and requirements.

The IEC 63382 series is intended to be used by the many stakeholders of ECV-DESS:

Aggregators/FO, e-mobility service providers, car makers, utilities (e.g. energy supplier (reseller), transmission grid operator (TSO), distribution grid operator (DSO), measuring point operator), EV users, EV charging station operators and owners, manufacturers and maintainers of interfacing products, technology providers (HW, SW, certification testing), software developers and system engineers.