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Electrical Energy Storage (EES) systems - Part 1: Terminology (IEC 62933-1:2018)

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Electrical Energy Storage (EES) systems - Part 1: Vocabulary (IEC 62933-1:2018)

Systèmes de stockage de l'énergie électrique (EES) - Partie
1: Vocabulaire
(IEC 62933-1:2018)

Elektrische Energiespeichersysteme (EES-Systeme) - Teil
1: Terminologie
(IEC 62933-1:2018)

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Electrical energy storage (EES) systems –
Part 1: Vocabulary

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Systèmes de stockage de l'énergie électrique (EES) –
Partie 1: Vocabulaire

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL ENERGY STORAGE (EES) SYSTEMS –**Part 1: Vocabulary**

FOREWORD

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International Standard IEC 62933-1 has been prepared by IEC technical committee 120: Electrical Energy Storage (EES) Systems.

The text of this standard is based on the following documents:

FDIS	Report on voting
120/116/FDIS	120/119/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62933 series, published under the general title *Electrical energy storage (EES) systems*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
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INTRODUCTION

The purpose of this terminology document is to provide terms and definitions for all the publications under the responsibility of TC 120, that standardize electrical energy storage systems (EES systems) including unit parameters, test methods, planning, installation, safety and environmental issues. An EES system includes any type of grid-connected energy storage which can both store electrical energy and provide electrical energy (from electricity to electricity).

All TC 120 normative documents are subject to revision, this part of IEC 62933 will be revised together with other TC 120 publications in order to avoid mismatches.

From the technical point of view, an EES system can be a complex multi stage system with several possible energy conversions. Each stage is made by components well standardized (e.g. transformers, power converter systems) or innovative components (e.g. new types of batteries). Several IEC product standards give definitions necessary for the understanding of certain terms used for these components. The International Electrotechnical Vocabulary (IEV, IEC 60050, <http://www.electropedia.org>), the IEC Glossary (<http://std.iec.ch/glossary>) and the ISO Online Browsing Platform (OBP, <http://www.iso.org/obp>) allow on-line access to this information. This terminology document completes the scenario by giving definitions necessary at the system level.

Without a strong standardization of EES systems terminology, focal terms can have a different meaning in EES systems related to different storage technologies. This aspect is critical also from the market point of view, it impacts economics and this can become a barrier for tender processes. The correct comparison among different options is fundamental, therefore basic terms and definitions impact economic decisions.

Terms and definitions have been harmonized with the IEV, the OBP, the IEC Glossary and other IEC documents as far as possible. Definitions not included in this terminology document may be found elsewhere in other IEC documents.

The use of abbreviated terms has been optimized, on the one hand to avoid tedious repetition and, on the other hand to avoid confusion. A minimum set of abbreviated terms was identified and used in the definitions, the other terms are written out in full spelling when needed. The widely accepted abbreviated terms are:

EES – EES System – Electrical energy storage system;

EES – Electrical energy storage;

POC – Point of connection.

ELECTRICAL ENERGY STORAGE (EES) SYSTEMS –

Part 1: Vocabulary

1 Scope

This part of IEC 62933 defines terms applicable to electrical energy storage (EES) systems including terms necessary for the definition of unit parameters, test methods, planning, installation, safety and environmental issues.

This terminology document is applicable to grid-connected systems able to extract electrical energy from an electric power system, store it internally, and inject electrical power to an electric power system. The step for charging and discharging an EES system may comprise an energy conversion.

2 Normative references

There are no normative references in this document.

3 Terms and definitions for EES systems classification

3.1

electrical energy storage

EES

installation able to absorb electrical energy, to store it for a certain amount of time and to release electrical energy during which energy conversion processes may be included

EXAMPLE A device that absorbs AC electrical energy to produce hydrogen by electrolysis, stores the hydrogen, and uses that gas to produce AC electrical energy is an electrical energy storage.

Note 1 to entry: The term “electrical energy storage” may also be used to indicate the activity that an apparatus, described in the definition, carries out when performing its own functionality.

Note 2 to entry: The term “electrical energy storage” should not be used to designate a grid-connected installation, “electrical energy storage system” is the appropriate term.

3.2

electrical energy storage system

EES system

EESS

grid-connected installation with defined electrical boundaries, comprising at least one electrical energy storage, which extracts electrical energy from an electric power system, stores this energy internally in some manner and injects electrical energy into an electrical power system and which includes civil engineering works, energy conversion equipment and related ancillary equipment

Note 1 to entry: The EES system is controlled and coordinated to provide services to the electric power system operators or to the electric power system users.

Note 2 to entry: In some cases, an EES system may require an additional energy source (non electrical) during its discharge, providing more energy to the electric power system than the energy it stored (compressed air energy storage is a typical example where additional thermal energy is required).

Note 3 to entry: “electric power system” is defined in IEC 60050-601:1985, 601-01-01.

3.3 utility grid

part of an electric power network that is operated by a utility or grid operator within a defined area of responsibility

Note 1 to entry: Utility grid is normally used for electricity transfer from or to grid users or other grids. The grid users can be electricity producers or consumers. The area of responsibility is fixed by national legislation or regulation.

Note 2 to entry: "electric power network" is defined in IEC 60050-601:1985, 601-01-02.

3.4 grid-connected, adj connected to an electric power system

Note 1 to entry: "electric power system" is defined in IEC 60050-601:1985, 601-01-01.

3.5 low voltage EESS EES system designed to be connected to a low voltage primary POC

Note 1 to entry: Low voltage (abbreviated term: LV) is defined in IEC 60050-601:1985, 601-01-26.

3.6 medium voltage EESS EES system designed to be connected to a medium voltage primary POC

Note 1 to entry: Medium voltage (abbreviated term: MV) is defined in IEC 60050-601:1985, 601-01-28.

3.7 high voltage EESS EES system designed to be connected to a high voltage primary POC

Note 1 to entry: High voltage (abbreviated term: HV) is defined in IEC 60050-601:1985, 601-01-27.

3.8 residential EESS EES system designed for residential customer applications, excluding commercial, industrial or other professional activities

Note 1 to entry: A residential EES system is normally compliant with the applicable standards for residential devices (e.g. electromagnetic compatibility), typically, its rated apparent power does not exceed the household installed power.

Note 2 to entry: "residential customer" is defined in IEC 60050-617:2009, 617-02-05.

3.9 commercial and industrial EESS EES system designed for commercial or industrial customer applications or other professional activities

Note 1 to entry: A commercial and industrial EES system is normally compliant with the applicable standards for commercial or industrial devices (e.g. electromagnetic compatibility).

3.10 utility EESS EES system as a component of a utility grid, which exclusively provides services to the utility grid

3.11 self-contained EES system EES system whose components have been matched and assembled at the factory, that is shipped in one or more containers, and that is ready to be installed in the field

Note 1 to entry: "container" is defined in IEC 62686-1:2015, 3.1.2.

3.12

long duration application

long term application

energy intensive application

EES system application generally not very demanding in terms of step response performances but with long charge and discharge phases at variable powers

Note 1 to entry: Reactive power exchange with the electric power system may be present along with the active power exchange.

Note 2 to entry: "electric power system" is defined in IEC 60050-601:1985, 601-01-01.

3.12.1

active power flow control

long duration application of an EES system used to compensate partially or totally the active power flow in a determined subsection of an electric power system

EXAMPLE Load shaving or levelling or shifting are active power flow controls.

Note 1 to entry: Active power flow control may require hours of continuous EES system charge or discharge.

Note 2 to entry: "electric power system" is defined in IEC 60050-601:1985, 601-01-01.

3.12.2

feeder current control

long duration application of an EES system used to maintain a feeder current within defined limits through active power exchange with the electric power network

EXAMPLE Congestion relief is a feeder current control.

Note 1 to entry: Theoretically, reactive power exchange may also allow the feeder current control, but, because of the typical feeder power factors, only the active power exchange is really effective.

Note 2 to entry: "electric power network" is defined in IEC 60050-601:1985, 601-01-02.

3.13

short duration application

short term application

power intensive application

EES system application generally demanding in terms of step response performances and with frequent charge and discharge phase transitions or with reactive power exchange with the electric power system

Note 1 to entry: "electric power system" is defined in IEC 60050-601:1985, 601-01-01.

3.13.1

grid frequency control

short duration application of an EES system used for the stabilization of the electric power system frequency through active power exchange

Note 1 to entry: The balancing of temporal variations of grid frequency occurs typically over time periods of the order of seconds to minutes.

Note 2 to entry: "electric power system" is defined in IEC 60050-601:1985, 601-01-01.

3.13.2

nodal voltage control

short duration application of an EES system used for the stabilization of the voltage at the primary POC or neighbouring nodes through active or reactive power exchange

Note 1 to entry: Reactive power is generally used in HV and MV grids, active power in LV grids, depending of the resistance-to-reactance (R/X) ratio of the relevant lines.