

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Electrical energy storage (EES) systems –  
Part 4-4: Environmental requirements for battery based energy storage systems  
(BESS) with reused batteries**

**Systèmes de stockage de l'énergie électrique (EES) –  
Partie 4-4: Exigences environnementales pour les systèmes de stockage de  
l'énergie sur batterie (BESS) avec batteries réutilisées**



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INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

ICS 13.020.30

ISBN 978-2-8322-7785-0

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## ELECTRICAL ENERGY STORAGE (EES) SYSTEMS –

**Part 4-4: Environmental requirements for battery-based energy storage systems (BESS) with reused batteries**

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

Draft	Report on voting
120/333/FDIS	120/338/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.

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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

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 document will remain unchanged until the stability date indicated on the IEC website under [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

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## INTRODUCTION

The increased use of renewable energy is enhancing the decarbonization of energy production by reducing CO<sub>2</sub> emissions caused by the use of fossil fuels. The production of renewable energy with solar and wind power is however associated with large temporal output fluctuations.

This causes increased voltage and frequency instabilities in the power grid. These irregularities can be advantageously counteracted with battery-based energy storage systems (BESS).

Such battery-based energy storage systems can be assembled with reused batteries coming from other electric energy storage installations or electric vehicles.

The reuse of batteries enhances all facets of the life cycle thinking (LCT) by reducing premature product obsolescence.

Reused cells, modules or battery assemblies entail particular attention toward the possible impact on the environment they will have due to their being a pre-aged component.

The impacts to the environment resulting from reused batteries are reviewed and appropriate requirements are defined.

This document complements, when reused batteries are involved, the information and guidance provided by IEC TS 62933-4-1.

## ELECTRICAL ENERGY STORAGE (EES) SYSTEMS –

### Part 4-4: Environmental requirements for battery-based energy storage systems (BESS) with reused batteries

#### 1 Scope

This part of the IEC 62933 series describes environmental issues when reused batteries are considered for a BESS.

It provides details and requirements for identifying and preventing environmental issues in each life cycle stage, i.e., from the design to the disassembly of such reused batteries in a BESS.

#### 2 Normative references

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.

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC TS 62933-4-1:2017, *Electric energy storage (EES) systems – Part 4-1: Guidance on environmental issues – General specification*

IEC Guide 109:2012, *Environmental aspects – Inclusion in electrotechnical product standards*

#### 3 Terms, definitions and abbreviated terms

##### 3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

##### 3.1.1 Battery-based energy storage system

###### BESS

Electrical energy storage system with an accumulation subsystem based on batteries with secondary cells

Note 1 to entry: Battery energy storage systems include flow battery energy systems.

##### 3.1.2

###### reuse, noun

operation by which secondary batteries that are not waste are used again in an application