



TECHNICAL SPECIFICATION

**Electrical energy storage (EES) systems –
Part 4-1: Guidance on environmental issues – General specification**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 13.020.30

ISBN 978-2-8322-4604-7

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	6
4 General	10
5 Identifying environmental issues in EES systems.....	10
5.1 General.....	10
5.2 Viewpoint 1: Guide for addressing environmental issues (ISO Guide 64:2008).....	10
5.3 Viewpoint 2: System aspects	11
5.3.1 General	11
5.3.2 System to environment	11
5.3.3 Environment to system	11
5.4 Viewpoint 3: Electrical energy storage technology independence	11
6 Environmental guidelines of EES systems	13
6.1 General.....	13
6.2 Guidelines for issues from the EES system to the environment	13
6.3 Guidelines for issues from the environment to the EES system	14
6.4 Guidelines for issues from the EES system to humans with a chronic impact	14
Annex A (informative) Examples of potential issues that are not selected as issues from the EES system to the environment	15
Bibliography.....	18
 Figure 1 – EES system architecture in the two main EESS configurations.....	 12
 Table 1 – Guidelines for issues from the EES system to the environment	 13
Table A.1 – Examples of potential issues that were not selected.....	15
Table A.2 – Result of assessment using viewpoints 1, 2 and 3.....	16

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTRICAL ENERGY STORAGE (EES) SYSTEMS –**Part 4-1: Guidance on environmental issues –
General specification**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a technical specification when

- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 62933-4-1 which is a technical specification, has been prepared by IEC technical committee 120: Electrical Energy Storage (EES) Systems.

The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
120/93/DTS	120/98/RVDTS

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

This document 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 website under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

Electrical energy storage systems (EES systems) have been integrated into the grid systems. The EES systems play one of the key roles in grid operation. Integrating the EES systems with the grid systems may further bring benefits such as efficient utilization in renewable energy sources. A variety of electrical energy storage technologies have been used widely in small and large sizes, for residential, industrial and utility siting, and in renewable energy stabilization and other applications. An EES system is an integrated system with components that are well standardised, however, system aspects specific to EES systems have not been well discussed. Furthermore, environmental issues for product level have been discussed horizontally in other IEC documents; however, specific environmental aspects of systems have not been well discussed. Therefore, a standard method for assessing environmental issues in EES systems is indispensable.

Under these circumstances, this document describes, in accordance with ISO Guide 64:2008, principles and approaches for environmental issues of EES systems in both normal and abnormal operating conditions, and presents guidelines to address environmental impacts to and from EES systems, including the chronic impacts on humans.

ELECTRICAL ENERGY STORAGE (EES) SYSTEMS –

Part 4-1: Guidance on environmental issues – General specification

1 Scope

This part of IEC 62933, which is a Technical Specification, describes environmental issues associated with electrical energy storage systems (EES systems), and presents guidelines to address the environmental impacts to and from EES systems including the impacts to humans due to chronic exposure associated with the mentioned environmental impacts.

It is the aim of this document to describe environmental issues that are uniquely and only applicable to EES systems. However, it is not the aim of this document to describe environmental issues that are applicable to any systems.

It is not the aim of this document to describe environmental issues associated with components and products used in EES systems.

This document applies to all EES systems regardless of the type of electrical energy storage technologies.

This document considers the issues in both normal and abnormal operating conditions.

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 62933-1¹, *Electrical energy storage (EES) systems – Part 1: Terminology*

¹ Under preparation. Stage at the time of publication: IEC/CDV 62933-1:2017.