

SS ISO 50015:2014(2023)
ISO 50015:2014, IDT
(ICS 03.100.70; 27.015)

SINGAPORE STANDARD

**Energy management systems – Measurement
and verification of energy performance of
organisations – General principles and guidance**

Confirmed 2023

SS ISO 50015:2014(2023)

ISO 50015:2014, IDT
(ICS 03.100.70; 27.015)

SINGAPORE STANDARD

**Energy management systems – Measurement and
verification of energy performance of organisations
– General principles and guidance**

Published by Enterprise Singapore

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilised in any form or by any means, electronic or mechanical, including photocopying and microfilming, without permission in writing from Enterprise Singapore. Request for permission can be sent to: standards@enterprisesg.gov.sg.

© ISO 2014
© Enterprise Singapore 2014

ISBN 978-981-4557-79-5

National Foreword

This Singapore Standard was prepared by the Working Group on Energy Management Systems set up by the Technical Committee on Energy under the purview of the Environment and Resources Standards Committee.

This standard is an identical adoption of ISO 50015:2014, “Energy management systems – Measurement and verification of energy performance of organizations – General principles and guidance”, published by the International Organization for Standardization. ISO 50015:2014 was confirmed by the International Organization for Standardization in 2020.

Attention is drawn to the possibility that some of the elements of this Singapore Standard may be the subject of patent rights. Enterprise Singapore shall not be held responsible for identifying any or all of such patent rights.

NOTE

- 1. Singapore Standards (SSs) and Technical References (TRs) are reviewed periodically to keep abreast of technical changes, technological developments and industry practices. The changes are documented through the issue of either amendments or revisions. Where SSs are deemed to be stable, i.e. no foreseeable changes in them, they will be classified as “mature standards”. Mature standards will not be subject to further review, unless there are requests to review such standards.*
- 2. An SS or TR is voluntary in nature except when it is made mandatory by a regulatory authority. It can also be cited in contracts making its application a business necessity. Users are advised to assess and determine whether the SS or TR is suitable for their intended use or purpose. If required, they should refer to the relevant professionals or experts for advice on the use of the document. Enterprise Singapore and the Singapore Standards Council shall not be liable for any damages whether directly or indirectly suffered by anyone or any organisation as a result of the use of any SS or TR. Although care has been taken to draft this standard, users are also advised to ensure that they apply the information after due diligence.*
- 3. Compliance with a SS or TR does not exempt users from any legal obligations.*

INTERNATIONAL
STANDARD

ISO
50015

First edition
2014-12-15

**Energy management systems —
Measurement and verification of
energy performance of organizations
— General principles and guidance**

*Systèmes de management de l'énergie — Mesure et Vérification de la
performance énergétique des organismes — Principes généraux et
recommandations*



Reference number
ISO 50015:2014(E)

© ISO 2014



COPYRIGHT PROTECTED DOCUMENT

© ISO 2014

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Measurement and verification principles	4
4.1 General principles.....	4
4.2 Appropriate accuracy and management of uncertainty.....	4
4.3 Transparency and reproducibility of M&V process(es).....	4
4.4 Data management and measurement planning.....	5
4.5 Competence of the M&V practitioner.....	5
4.6 Impartiality.....	5
4.7 Confidentiality.....	5
4.8 Use of appropriate methods.....	5
5 Measurement and verification plan	5
5.1 General.....	5
5.2 Scope and purpose.....	6
5.3 Energy performance improvement actions.....	7
5.4 M&V boundaries.....	7
5.5 Preliminary M&V plan assessment.....	8
5.6 Characterization and selection of energy performance metrics including EnPIs.....	8
5.7 Characterization and selection of relevant variables and static factors.....	9
5.8 Selection of the M&V method and calculation method.....	9
5.9 Data.....	
gathering plan.....	10
5.10 Energy baseline establishment and adjustments.....	11
5.11 Resources required.....	12
5.12 Roles and responsibilities.....	12
5.13 Documentation of the M&V plan.....	12
6 Implementation of M&V plan	12
6.1 Data.....	
gathering.....	12
6.2 Verification of the implementation of the EPIA(s).....	13
6.3 Observation anticipated or unforeseen changes.....	13
6.4 M&V analysis.....	13
6.5 M&V reporting.....	14
6.6 Review the need to repeat the process.....	14
7 Uncertainty	14
8 Measurement and verification documentation	15
Annex A (informative) Overview of the measurement and verification flow	16
Annex B (informative) Measurement uncertainty examples	17
Bibliography	18

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is Technical Committee ISO/TC 242, *Energy management*.

Introduction

The purpose of this International Standard is to establish a common set of principles and guidelines to be used for measurement and verification (M&V) of energy performance and energy performance improvement of the organization. M&V adds value by increasing the credibility of energy performance and energy performance improvement results. Credible results can contribute to the pursuit of energy performance improvement.

This International Standard can be used irrespective of the type of energy used.

This International Standard can be used in several organizational contexts:

- by organizations with or without existing energy management systems, such as ISO 50001;
- for the M&V of energy performance or energy performance improvement;
- for all or part of an organization.

This International Standard can be used by organizations of any size, M&V practitioners, or any interested parties, in order to apply M&V to the reporting of energy performance results. The principles and guidance in this International Standard can be used independently or in conjunction with other standards and protocols. The principles and guidance in this International Standard are not required by ISO 50001, but can be applied by organizations using ISO 50001.

This International Standard does not specify calculation methods; rather, it establishes a common understanding of M&V and how M&V could be applied to different calculation methods. These principles and guidelines are applicable irrespective of the M&V method used.

[Annex A](#) provides an overview of the M&V flow that is used throughout this International Standard.

This International Standard is one of a family of International Standards developed by ISO/TC 242 and ISO/TC 257, on energy management and on the evaluation of energy savings related to regions and projects. Both ISO/TC 242 and ISO/TC 257 address organizational energy management and energy savings.

Energy management systems — Measurement and verification of energy performance of organizations — General principles and guidance

1 Scope

This International Standard establishes general principles and guidelines for the process of measurement and verification (M&V) of energy performance of an organization or its components. This International Standard can be used independently, or in conjunction with other standards or protocols, and can be applied to all types of energy.

2 Normative references

There are no normative references.