INTERNATIONAL STANDARD

ISO 17741

First edition
2016-05-01

General technical rules for measurement, calculation and verification of energy savings of projects

Règles techniques générales pour la mesure, le calcul et la vérification des économies d'énergie dans les projets

Reference number
ISO 17741:2016(E)

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

Page

Foreword ..... **iv**
Introduction ..... **v**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Concept of energy savings of a project **5**
5 Procedure of M&V of energy savings **6**
5.1 General 6
5.2 Logical relationship between the M&V and the project implementation 6
6 Measurement & verification plan (M&V plan) **8**
6.1 General 8
6.2 Boundary identification 8
6.3 Determination of baseline period and reporting period 9
6.3.1 General 9
6.3.2 Baseline period 9
6.4 Calculation methods of energy savings 9
6.4.1 General 9
6.4.2 Method I: Direct comparison 10
6.4.3 Method II: Adjusted baseline calculation 11
6.4.4 Method III: Calibrated simulation 12
6.5 Specification of data collection 14
6.6 Uncertainty 15
6.7 Measurement & verification options (M&V options) 17
7 Report **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 ISO/TC 257, *Evaluation of energy savings*.

Introduction

The purpose of this International Standard is to establish a set of general rules for measurement, calculation and verification of energy savings of projects. These general rules are considered universal and are applicable irrespective of the measurement and verification (M&V) methodology used. This International Standard is designed to be used by all the project stakeholders that aim to quantify the energy savings over a specific period in the new projects or retrofit projects. It could reduce the technical and financial barriers in the measurement, calculation and verification for energy saving projects.

This International Standard specifies the basic procedure of M&V of energy savings of M&V plan. A common understanding of M&V on project level is established by outlining how calculation methods for M&V could be selected under different project scenarios. It is intended as a set of principles, guidance and methods for M&V of energy savings that can be applied to a broad variety of projects.

There are numerous calculation methods and M&V methodologies available to quantify energy savings but credible determination of energy savings is considered essential for all the project stakeholders to have a clear and correct understanding of the energy performance of project.

In this International Standard, energy savings are determined by comparing measured, calculated or simulated energy consumption before and after and/or with and without implementation of a project and making suitable adjustments for changes in relevant variables (routine adjustment) or suitable adjustments for changes in static factors (non-routine adjustment) and therefore energy savings are the difference between the adjusted energy baseline and the reporting period energy consumption.

This International Standard can be used by any interested party in order to apply M&V to the reporting of energy savings results.

General technical rules for measurement, calculation and verification of energy savings of projects

1 Scope

This International Standard specifies the general technical rules for measurement, calculation and verification of energy savings in retrofits projects or new projects.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EVO 10000-1:2014, *International Performance Measurement and Verification Protocol, Core Concepts*

3 Terms and definitions

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

3.1
baseline period
specific period of time before the implementation of *energy performance improvement action* (3.8) selected for the comparison with the *reporting period* (3.19) and the calculation of *energy savings* (3.9)

[SOURCE: ISO/IEC 13273-1:2015, 3.3.8.1, modified — "energy performance" replaced by "energy savings" and deleted "and of energy performance improvement action"]

3.2
boundary
physical or virtual limit around *energy using systems* (3.11) or facilities which are related to (an) *energy performance improvement action(s)* (3.8)

Note 1 to entry: Project boundary is a boundary around (an) *energy performance improvement action(s)* (3.8).

Note 2 to entry: M&V boundary is a boundary which is affected by (an) *energy performance improvement action(s)* (3.8).

3.3
energy
capacity of a system to produce external activity or to perform work

Note 1 to entry: Commonly the term energy is used for electricity, fuel, steam, heat, compressed air and other like media.

Note 2 to entry: Energy is commonly expressed as a scalar quantity.

Note 3 to entry: Work as used in this definition means external supplied or extracted energy to a system. In mechanical systems, forces in or against direction of movement; in thermal systems, heat supply or heat removal.

[SOURCE: ISO/IEC 13273-1:2015, 3.1.1]