
**General methods for predicting
energy savings**

Méthodes générales d'estimation des économies d'énergie



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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 of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 301, *Energy management and energy savings*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document specifies general methods for the calculation of predicted energy savings (PrES). It also provides a process that should result in PrES satisfactory for the relevant stakeholders. It is meant to be used after the opportunities for energy performance improvements have been identified, but prior to the implementation of energy performance improvement actions (EPIAs). It is, therefore, meant to be used when selecting or specifying the EPIAs or the action plan, programme or policy to be subsequently implemented, as represented in [Figure 1](#).

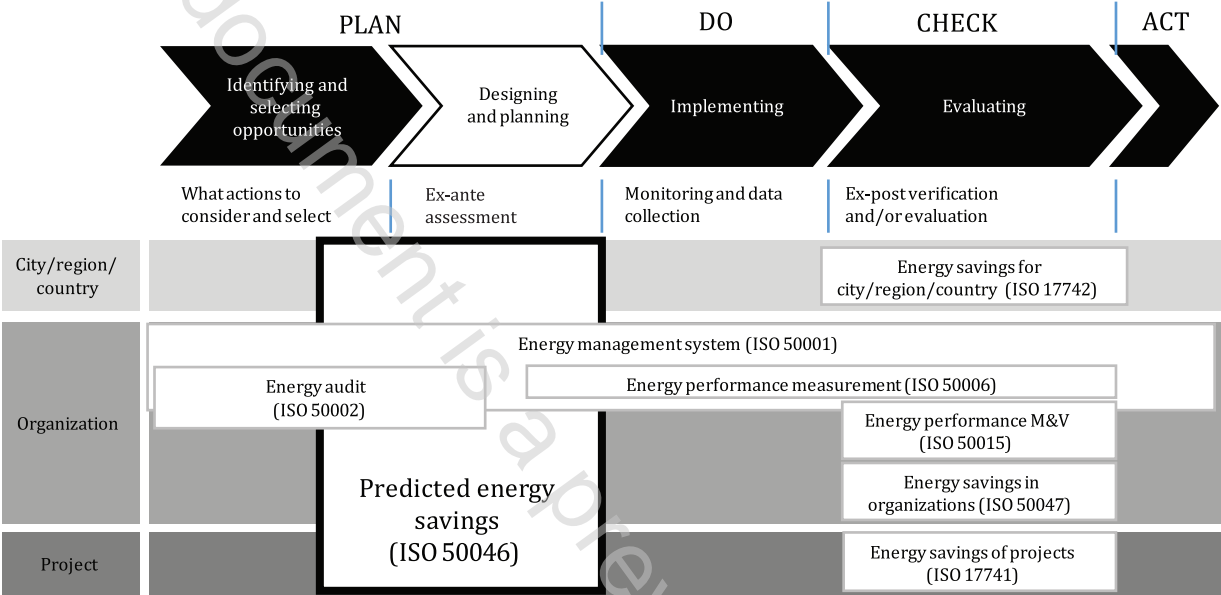


Figure 1 — The place of this document in a continual improvement process

The calculation of PrES can be undertaken on its own, or as part of a more comprehensive evaluation cycle. In the latter case, complementary guidance can be found in other documents, as illustrated in [Figure 1](#).

This document builds on the general principles outlined in ISO 17743, which provides a methodological framework applicable to the calculation of and reporting on energy savings.

ISO 17742 deals with energy savings at the level of countries, regions or cities, distinguishing indicator-based and measure-based calculation methods.

ISO 50047 deals with energy savings in organizations. It uses an organization-based approach (a form of top-down approach), and an EPIA-based approach (sometimes referred to as being a “bottom-up” approach).

ISO 17741 deals with general technical rules for the measurement, calculation and verification of energy savings of projects.

This document uses the distinction between measure-based methods and indicator-based (or total-consumption-based) methods. Instead of distinguishing between the scopes of geographical entities, operational entities and physical systems, it makes a distinction between the levels of aggregation of energy savings: either unit level (action or project) or aggregated level (action plan, programme or policy).

This document provides a process for increasing the transparency of data and calculations used to predict energy savings. Examples of the use of PrES include:

- for selecting among energy savings opportunities;

- for investment decisions;
- for accounting or crediting energy savings (e.g. energy savings certificates^[14]).

It provides methods that can be used, for example, in the context of energy audits, energy savings obligations, energy efficiency portfolio standards^[14], voluntary agreements or energy performance contracting.

Irrespective of the methods chosen, validation and documentation of the calculation of PrES add value by increasing their credibility and reliability.

Following a bottom-up approach (measure-based methods, see ISO 17742), this document starts with the calculation of the PrES at the level of an EPIA or a group of EPIAs to be jointly implemented at the same site or by the same organization or energy end-user. These unitary PrES might then be aggregated to calculate the PrES of an action plan, programme or policy under consideration, taking into account causality issues wherever applicable.

For the calculation of the PrES of an EPIA, this document presents three different methods, classified as empirical estimation, statistical modelling and engineering modelling. These methods can be applied to different types of situations. The two general situations considered are (see 4.2):

- when users want to determine PrES according to the specific context in which the EPIA will be implemented;
- when users want to determine reference values of PrES for given types of EPIA.

[Clause 4](#) of this document explains the objectives, context and principles of calculation of PrES. [Clause 5](#) describes the preparation of the calculation process (preliminary step). [Clause 6](#) describes the calculation process at the level of an EPIA. [Clause 7](#) describes the additional steps needed for aggregating the PrES of an action plan, policy or programme. [Clause 8](#) provides guidance on quality and uncertainty analysis. [Clauses 4, 5, 6 and 8](#) are common to both aggregation levels (EPIA level and aggregated level).

General methods for predicting energy savings

1 Scope

This document specifies general methods for the calculation of predicted energy savings (PrES), using measure-based calculation methods, also known as bottom-up or energy performance improvement actions (EPIAs)-based methods (see ISO 17742). Indicator-based methods (see ISO 17742) and total-consumption-based methods (see ISO 50047) are not included in the scope of this document.

This document provides general principles for categorizing and choosing the method, taking account of the context, targeted accuracy and resources available for calculating the PrES. It also provides guidance on the conditions for ensuring the quality of the PrES, their documentation and validation.

It is applicable to calculation of PrES for any:

- type of EPIA;
- end-use sector;
- energy end-use;
- level of aggregation of energy savings;
- stakeholder.

NOTE 1 Stakeholders can include private or public organizations, energy auditors, energy services companies, energy and equipment suppliers, policy makers, etc.

This document considers PrES from:

- an EPIA; and/or
- an action plan, programme or policy (aggregated energy savings).

NOTE 2 An action plan, programme or policy can be implemented at different scales (organization, city, region, country).

This document describes how to calculate PrES over a prediction period. It can be used to calculate PrES in terms of primary energy or final (or delivered) energy (as defined in ISO 50047 and ISO/IEC 13273-1).

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

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

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