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Irish Standard
I.S. EN 16212:2012

# Energy Efficiency and Savings Calculation, Top-down and Bottom-up Methods

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I.S. EN 16212:2012

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

**EN 16212**

August 2012

ICS 27.010

English version

# Energy Efficiency and Savings Calculation, Top-down and Bottom-up Methods

Efficacité énergétique et calcul d'économies - Méthodes top-down (descendante) et bottom-up (ascendante)

Energieeffizienz und -einsparberechnung - Top-Down- und Bottom-Up-Methoden

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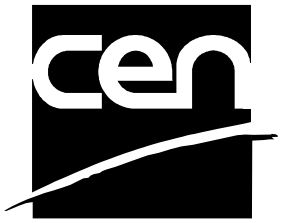

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# Foreword

This document (EN 16212:2012) has been prepared by Technical Committee CEN/CLC/TC JWG 4 “Energy Efficiency and Energy Savings Calculation”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2013, and conflicting national standards shall be withdrawn at the latest by February 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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# Introduction

Due to uncertainties of energy supply and the need to limit the greenhouse effect, European countries have adopted policies to increase the energy efficiency and to develop the use of renewable energy sources. The amount of energy to be saved in each state separately, and overall for the European Union (EU), has been notified in international agreements. In recent years the EU has adopted several Directives as part of the efforts at EU level to improve energy efficiency. An example is the Directive 2006/32/EC on energy end-use efficiency and energy services (ESD). The ESD establishes for 2016 a national indicative energy savings target, equal to 9 % of final energy consumption in five years before 2007.This target is to be reached through energy services and other energy efficiency improvement measures.

The formulation of policies and targets has led to the need for harmonised monitoring and evaluation methods on energy savings at international level and at European level. In addition many countries that get involved in the monitoring of the energy savings achieved, or the impact of implemented policies and measures, need these calculation methods as well.

This European Standard covers the following topics:

— the methodology and general rules of calculation;

— terminology and definitions;

— parameters and data, including data quality and data sources.

This European Standard covers both top-down and bottom-up calculation methods. The top-down method is based on energy indicators (e.g. mean gas consumption per dwelling) which are often calculated from statistical data. The bottom-up method considers end-user actions and facilitating measures to enhance energy efficiency. For top-down the standard uses the results of earlier indicator work in the Odyssee project and in the framework of the ESD. For bottom-up the standard builds on the results of the EMEEES project, initially done in the framework of the ESD implementation. These results are the starting point for this standard which is general in nature and applicable to a larger category of purposes and users than the EU-driven ESD.

NOTE 1 The ODYSSEE project develops and updates energy efficiency indicators that can be used to calculate top-down energy savings for the 27 EU countries plus Norway and Croatia.

NOTE 2 The EMEEES project dealt with the definition of top-down and bottom-up calculation methods to monitor the ESD savings.

The top-down and bottom-up calculation methods are presented as two separate calculation methods. Using a combination of top-down and bottom-up methods is not part of this standard. However, the differences and application of both methods will be highlighted.

This European Standard provides a general framework for calculating energy savings. For top-down, examples of specific calculations per indicator are presented separately. For bottom-up, one specific application case, on building energy use, is presented as example.

After normative references (Clause 2) and terms and definitions (Clause 3) the characteristics of the top-down and bottom-up methods are presented in Clause 4. The top-down calculation method is described in Clause 5 and the bottom-up calculation methods in Clause 6. Annex A provides some example indicators that may be used in top-down calculations. Annex B deals with the level of detail at which bottom-up methods can be applied. Annex C describes the bottom-up example case for buildings.

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# 1 Scope

This European Standard provides a general approach for energy efficiency and energy savings calculations with top-down and bottom-up methods. The general approach is applicable for energy savings in buildings, cars, appliances, industrial processes, etc.

This European Standard covers energy consumption in all end-use sectors. The standard does not cover energy supply, e.g. in power stations, as it considers only final energy consumption.

This European Standard deals with savings on energy supplied to end-users. Some forms of renewable energy “behind-the-meter” (e.g. from solar water heating panels) reduce supplied energy and therefore can be part of the calculated energy savings. Users of the standard should be aware that this renewable energy behind the meter can also be claimed as energy generated.

The standard is meant to be used for ex-post evaluations of realised savings as well as ex-ante evaluations of expected savings.

This European Standard provides saving calculations for any period chosen. However, short data series may limit the possible periods over which savings can be calculated.

The standard is not intended to be used for calculating energy savings of individual households, companies or other end-users.

# 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.

CWA 15693:2007, *Saving Lifetimes of Energy Efficiency Improvement Measures in bottom-up calculations*

# 3 Terms and definitions

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

**3.1**
**adjustment factor**
quantifiable parameter affecting energy consumption

[SOURCE: CEN/CLC/TR 16103:2010]

Note 1 to entry: Adjustment factors are mainly used in the bottom-up method.

EXAMPLE Weather conditions, behaviour related parameters (indoor temperature, light level) working hours, production throughput.

**3.2**
**baseline**
energy consumption calculated or measured, possibly normalised, in the situation without an end-use action

Note 1 to entry: The baseline provides a reference against which measurements can be taken or compared.

Note 2 to entry: The baseline can contain other actions but not the action under consideration.

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