



Proposal for changes to the bottom-up methods of energy efficiency monitoring for the purposes of the EED (Directive 2012/27/EU)

Proposal 2014

Authors: Christoph Ploner
Gregor Thenius

Commissioned by: BMWFW (Austrian Federal Ministry of Science, Research and Economy)



Publishing information

Published by: Österreichische Energieagentur – Austrian Energy Agency,
Mariahilfer Str.136, A-1150 Vienna; Tel. +43 (1) 586 15 24, Fax +43 (1) 586 15 24 - 340;
Email: office@energyagency.at, internet: www.energyagency.at | www.monitoringstelle.at

Responsible for the content: DI Peter Traupmann

Overall direction: Mag. Gregor Thenius

Manufactured by: Österreichische Energieagentur – Austrian Energy Agency

Place of publication and manufacture: Vienna

This publication may only be reproduced in the form of excerpts accompanied by an exact indication of the source.

Printed on chlorine-free bleached paper.

Contents

1 INTRODUCTION	4
2 DESCRIPTION OF THE EXAMPLE BUILDINGS USED TO CALCULATE EXPENDITURE FACTORS.....	5
2.1 U-VALUES PURSUANT TO THE 'ENERGY PERFORMANCE OF BUILDINGS GUIDELINE' OIB-300.6-039/07.....	5
2.2 CALCULATED HEATING REQUIREMENT VALUES FOR THE AFOREMENTIONED BUILDINGS.....	6
3 ENERGY ADVICE.....	8
4 THERMALLY IMPROVED BUILDING ENVELOPE	8
4.1 RESIDENTIAL BUILDINGS.....	9
4.2 NON-RESIDENTIAL BUILDINGS	10
5 SMART METERS AND INFORMATIVE BILLING.....	11
6 WHITE GOODS (HOUSEHOLD APPLIANCES)	12
6.1 NEW ACQUISITIONS OF REFRIGERATORS AND FREEZERS BELONGING TO THE A+++ EFFICIENCY CLASS (OR THE BEST EFFICIENCY CLASS AVAILABLE)	12

1 Introduction

The document 'Methods to assess the attainment of targets in compliance with the Energy End-use Efficiency and Energy Services Directive 2006/32/EC – Bottom-up methods – October 2013' shall also provide the basis for calculating final energy savings as per Article 7 of the Energy Efficiency Directive (EED).

In light of the additional requirements of the EED compared to those of the ESD, as well as changes in other underlying circumstances, there are some changes which must be made to the aforementioned document. This proposal document summarises the changes that are required and puts forward adapted calculation values for the affected methods.

Changes are proposed, as described below, for the following methods:

- Description of the example buildings used to calculate expenditure factors
- Energy advice
- District heating
- Thermally improved building envelope
- Boiler replacement
- Smart meters and informative billing
- Heat pump
- White goods (household appliances)

2 Description of the example buildings used to calculate expenditure factors

2.1 U-values pursuant to the 'Energy Performance of Buildings Guideline' OIB-300.6-039/07

An additional age category for buildings (1982) is to be added for the determination of the U-values of the existing building stock. This has a corresponding effect on the average. The additional and changed values are highlighted in red.

Table 2-1: U-values pursuant to the 'Energy Performance of Buildings Guideline' OIB-300.6-039/07

	KD	OD	AW	FE	g
NÖ 1960:	0.90	0.52	1.25	2.50	0.67
NÖ 1969:	0.63	0.48	0.80	2.50	0.67
NÖ 1976:	0.56	0.44	0.60	2.50	0.67
NÖ 1982:	0.80	0.30	0.70	2.50	0.67
Average:	0.72	0.44	0.84	2.50	0.67

2.2 Calculated¹ heating requirement values² for the aforementioned buildings

'Old envelope' (existing buildings, not renovated)

Single-family house heating requirement ref: **143.6 kWh/m²/year**

Small block of flats heating requirement ref: **103.1 kWh/m²/year**

Large-scale residential building heating requirement ref: **77.5 kWh/m²/year**

Special case: Large-scale residential building heating requirement ref., old buildings (ca. 1900): 140.69 kWh/m²/year

'New envelope' (new buildings)

Single-family house heating requirement ref: **56.68 kWh/m²/year**

Small block of flats heating requirement ref: **41.00 kWh/m²/year**

Large-scale residential building heating requirement ref: **33.27 kWh/m²/year**

'New envelope' (existing buildings, renovated³)

¹ Using the ETU tool for energy certificate calculations, 2011

² The heating requirement values listed here apply for the specified average buildings and are used in the calculation of expenditure factors. To calculate the final energy savings resulting from renovation of the thermal building envelope, a heating requirement of 200 kWh/m²/year or 90 kWh/m²/year is reverted to, as specified in the document 'Reporting template of the Federal Ministry of Agriculture, Forestry, Environment and Water Management (Lebensministerium) for meeting the reporting requirements according to Art. 10 of the agreement under Art. 15a of the Federal Constitutional Law (B-VG) between the federal government and the federal states concerning joint quality standards to subsidise the construction and renovation of residential buildings in order to reduce greenhouse gas emissions (BGBl (Federal Law Gazette) II No 19/2006)'.

³ In accordance with OIB (Austrian Institute of Construction Engineering) Guideline 6 'extensive renovation' values from 01/01/ 2014: $HWB_{max} = 23 \times (1 + 2.5/l_e)$

Single-family house heating requirement ref: **71.73 kWh/m²/year**

Small block of flats heating requirement ref: **52.95 kWh/m²/year**

Large-scale residential building heating requirement ref: **43.68 kWh/m²/year**

The heating requirement values described above are to be included accordingly in the evaluation methods for:

- District heating
- Boiler replacement
- Heat pump

3 Energy advice

The values for the final energy and electricity consumption of an average household are to be updated, in line with the values in the 2013 energy balance and the latest statistics on households in Austria (data published 2012). All other default values remain the same. The changed values are highlighted in red.

Default values

e_{Q1} Savings factor of an audit at quality level 1:	0.25%
e_{Q2} Savings factor of an audit at quality level 2:	1%
e_{Q3} Savings factor of an audit at quality level 3:	3%
Lifetime according to CEN (CEN WS 27 Final CWA Draft) ⁴ :	2 years
EEV_{HH} Final energy consumption of an average household [kWh per year] ⁵	21 800 kWh
$EEV_{HH/Ström}$ Electricity consumption (not including space heating and air conditioning) of an average household [kWh per year]	3 900 kWh

⁴ This lifetime is, according to CEN WS 27 Final CWA Draft, a default value that can be adjusted at a national level if transparent data/studies are available.

⁵ For the year **2012** the micro-census (family and household statistics) recorded **3.678 million** private households. The total final energy consumption of private households in 2006 stood at **275 141 TJ**, with final consumption of electrical energy at **60 695 TJ** (Source: Statistics Austria, energy balance **2012**).

4 Thermally improved building envelope

With regard to the methods for thermally improved building envelopes, the baseline heating requirement values shall change in line with the planned tightening of the Residential and Non-residential Building Regulation (Bauordnung für Wohn- und Nicht-Wohngebäude).

4.1 Residential buildings

Baseline heating requirement, new building

Default values in accordance with OIB Guideline 6

Until 31/12/2009	$HWB_{BGF,WG,max,Ref} = 26^*(1+2.0/l_c)$ [kWh/m²/year]	Maximum of 78.0 [kWh/m ² /year]
Single-family houses		67.6 (where $l_c = 1.25$)
Small block of flats		46.8 (where $l_c = 2.5$)
From 01/01/2010	$HWB_{BGF,WG,max,Ref} = 19^*(1+2.5/l_c)$ [kWh/m²/year]	Maximum of 66.5 [kWh/m ² /year]
Single-family houses		57.0 (where $l_c = 1.25$)
Small block of flats		38 (when $l_c=2.5$)
From 01/01/2014	$HWB_{BGF,WG,max,Ref} = 16^*(1+2.5/l_c)$ [kWh/m²/year]	Maximum of 54.4 [kWh/m ² /year]
Single-family houses		54.4 (when $l_c=1.25$)
Small block of flats		35.2 (when $l_c=2.5$)
From 01/01/2016	$HWB_{BGF,WG,max,Ref} = 14^*(1+2.5/l_c)$ [kWh/m²/year]	
Single-family houses		
Small block of flats		
From 01/01/2018	$HWB_{BGF,WG,max,Ref} = 12^*(1+2.5/l_c)$ [kWh/m²/year]	
Single-family houses		
Small block of flats		
From 01/01/2020	$HWB_{BGF,WG,max,Ref} = 10^*(1+2.5/l_c)$ [kWh/m²/year]	
Single-family houses		
Small block of flats		

4.2 Non-residential buildings

In general, the minimum requirements and interim targets for non-residential buildings will be analogous to those for residential buildings. However, the negotiations concerning these minimum requirements for non-residential buildings have not yet been concluded.⁶

Baseline heating requirement, new building

Default values in accordance with OIB Guideline 6

Until 2011	$HWB_{V,NWG,max,RK} = 9.0 \cdot (1 + 2.0/l_c)$ [kWh/m ³ /year]	Maximum of 27.0 kWh/m ³ /year
From 2011	$HWB_{V,NWG,max,RK} = 5.5 \cdot (1 + 3.0/l_c)$ [kWh/m ³ /year]	Maximum of 18.7 kWh/m ³ /year

Baseline heating requirement, renovation

Default values, baseline heating requirement, renovation: from OIB Guideline 6

Until 2011	$HWB_{V,NWG,max,RK} = 11.0 \cdot (1 + 2.0/l_c)$ [kWh/m ³ /year]	Maximum of 33.0 kWh/m ³ /year
From 2011	$HWB_{V,NWG,max,RK} = 8.5 \cdot (1 + 2.5/l_c)$ [kWh/m ³ /year]	Maximum of 30.0 kWh/m ³ /year

⁶ OIB document on the definition of a nearly zero-energy building and on the setting of interim targets in a 'National Plan' pursuant to Article 9 (3) of 2010/31/EU.

5 Smart meters and informative billing

Default values

Savings factor due to the introduction of a smart metering and billing system in a private household	3%
Lifetime for 'feedback on use from smart meters' according to CEN (CEN WS 27 Final CWA Draft) ⁷	2 years
Final energy consumption of an average household [kWh per year] ⁸	21 800 kWh
Electricity consumption of an average household [kWh per year]	4 800 kWh

⁷ This lifetime is, according to CEN WS 27 Final CWA Draft, a default value that can be adjusted at a national level if transparent data/studies are available.

⁸ For the year 2006 the micro-census (family and household statistics) recorded 3.508 million private households. The total final energy consumption of private households in 2006 stood at 276 128 TJ, with final consumption of electrical energy at 53 620 TJ (Source: Statistics Austria, energy balance 2006).

6 White goods (household appliances)

6.1 New acquisitions of refrigerators and freezers belonging to the A+++ efficiency class (or the best efficiency class available)

Default values

Average annual energy consumption of an appliance of efficiency class A+ (fridge-freezer, one-door, usable volume of 210 l) [kWh] ⁹	230
Average annual energy consumption of an appliance of efficiency class A+++ (fridge-freezer, one-door, usable volume of 210 l) [kWh] ¹⁰	115
Lifetime [years] (Harmonised value in accordance with 'Saving lifetimes of Energy Efficiency Improvement Measures in bottom-up calculations – Final CWA draft (CEN WS 27)', 2007)	15

⁹ www.topprodukte.at, 2014

¹⁰ www.topprodukte.at, 2014

Resource Security
Competitiveness
Sustainability
Perspectives