

# ISO/TR 52000-2:2017-06 (E)

## Energy performance of buildings - Overarching EPB assessment - Part 2: Explanation and justification of ISO 52000-1

---

<b>Contents</b>	<b>Page</b>
Foreword .....	vi
Introduction .....	vii
<b>1</b> <b>Scope</b> .....	<b>1</b>
<b>2</b> <b>Normative references</b> .....	<b>1</b>
<b>3</b> <b>Terms and definitions</b> .....	<b>2</b>
3.1 <b>Buildings</b> .....	2
3.2 <b>Indoor and outdoor conditions</b> .....	3
3.3 <b>Technical building systems</b> .....	3
3.4 <b>Energy</b> .....	4
3.5 <b>Energy performance</b> .....	4
3.6 <b>Energy calculation</b> .....	4
3.7 <b>General information on terms and definitions</b> .....	4
3.7.1 <b>General</b> .....	4
3.7.2 <b>Overarching terms and definitions</b> .....	4
3.7.3 <b>Difference between definition and specification</b> .....	5
3.7.4 <b>Undefined and/or unspecified policy related terms</b> .....	5
<b>4</b> <b>Symbols, units, subscripts and abbreviations</b> .....	<b>5</b>
4.1 <b>Symbols</b> .....	5
4.2 <b>Subscripts</b> .....	6
4.3 <b>Abbreviations</b> .....	6
<b>5</b> <b>Description of the overarching framework and procedures</b> .....	<b>6</b>
5.1 <b>Output of the method</b> .....	6
5.2 <b>General description of the procedures and routing</b> .....	7
5.3 <b>Selection criteria between the methods</b> .....	7
5.4 <b>The over-arching reference modular structure</b> .....	7
5.4.1 <b>Purpose</b> .....	7
5.4.2 <b>Systematic modular structure of the standards</b> .....	7
5.4.3 <b>The connection between the modules - step by step implementation</b> .....	8
5.4.4 <b>Systematic consecutive numbering of the standards</b> .....	10
<b>6</b> <b>Overarching preparation steps</b> .....	<b>11</b>
6.1 <b>General</b> .....	11
6.2 <b>List of types and categories</b> .....	13
6.2.1 <b>Type of object</b> .....	13
6.2.2 <b>Building category and space categories</b> .....	14
6.2.3 <b>Type of application</b> .....	15
6.2.4 <b>Types of assessment</b> .....	15
6.2.5 <b>Building services</b> .....	16
6.3 <b>Identification of types and categories for a specific case</b> .....	17
6.4 <b>Example cases</b> .....	17
6.4.1 <b>General</b> .....	17
6.4.2 <b>Example case 1</b> .....	18
6.4.3 <b>Example case 2</b> .....	19
6.4.4 <b>Example case 3</b> .....	19
6.4.5 <b>Example case 4</b> .....	20

6.4.6	Example case 5 .....	21
6.4.7	Example case 6 .....	22
7	Calculated energy performance of buildings .....	22
7.1	Output data .....	22
7.2	Calculation intervals and calculation period .....	22
7.2.1	Calculation interval .....	22
7.2.2	Calculation period .....	25
7.3	Input data .....	25
7.3.1	Product data .....	25
7.3.2	System design data .....	25
7.3.3	Operating conditions .....	25
7.3.4	Constants and physical data .....	27
7.3.5	Other data .....	27
7.4	Description of the calculation procedure .....	28
8	Measured overall energy performance and comparison with calculations .....	28
8.1	General .....	28
8.2	Output of the method .....	29
8.3	Measurement intervals and measurement period .....	29
8.4	Input data .....	30
8.4.1	Product data .....	30
8.4.2	System design data .....	30
8.4.3	Operating conditions data .....	30
8.4.4	Constants and physical data .....	31
8.4.5	Other data .....	31
8.5	Measurement procedures .....	31
8.6	Calculation of the energy performance based on measured energy .....	31
8.7	Comparison between calculated energy performance and measured energy performance .....	31
8.8	Measured energy performance reporting .....	32
9	Overall assessment of the energy performance of buildings .....	32
9.1	Categorization of building and/or spaces .....	32
9.2	Combination of building services included in EPB in each space .....	32
9.3	Useful floor area and air volume .....	32
9.4	Normalization to building size .....	33
9.4.1	Reference size .....	33
9.4.2	Normalization .....	35
9.4.3	Reference floor area .....	35
9.5	Assessment boundary and perimeters .....	35
9.5.1	General principles .....	35
9.5.2	Assessment boundary for multiple buildings .....	36
9.6	Overall energy performance .....	36
9.6.1	Weighted overall energy balance .....	36
9.6.2	Primary energy factors .....	37
9.6.3	Greenhouse gas emission factors .....	39
9.6.4	Additional weighting factors .....	39
9.6.5	Costs factors .....	39
9.6.6	Weighting factors for exported energy .....	39
9.6.7	Energy flows .....	42
9.7	Share of renewable energy .....	43
9.7.1	General .....	43
9.7.2	Amount of primary energy from renewable source $EP_{ren}$ .....	43
9.7.3	Amount of total primary energy $EP_{tot}$ .....	43
9.7.4	Examples of RER calculation .....	43
9.8	Energy performance indicators for technical building systems .....	45
9.9	Calculation methods for energy performance indicators per part of a building and/or service .....	45
10	Zoning .....	46

10.1	General .....	46
10.2	Thermal zones and service areas .....	48
10.3	Spaces .....	48
10.4	Zoning rules .....	50
10.4.1	Principle .....	50
10.4.2	Specific zoning criteria .....	51
10.5	Assignment rules .....	52
10.5.1	Subdivision .....	52
10.5.2	Recombination .....	54
10.6	Zoning procedure .....	55
11	Calculation of the energy performance, routing and energy balance .....	55
11.1	General .....	55
11.2	Overall calculation procedure (steps) .....	55
11.3	Calculation principles of the recovered gains and losses .....	56
11.4	Effect of building automation and control (BAC) and technical building management (TBM) .....	56
11.5	Climatic and external environment data .....	61
11.6	Overall energy performance .....	61
11.6.1	General .....	61
11.6.2	Electricity and other energy carriers with exportation .....	61
11.6.3	Energy carriers without exportation .....	72
11.6.4	Exported heat on-site produced and not included in thermal use of the building .....	72
12	Common overarching output - General .....	73
12.1	General .....	73
12.2	Tabulated overview of the amounts of energy per energy carrier and energy service .....	75
12.2.1	Absolute values .....	75
13	Additional information to the over-arching EPB standard .....	89
13.1	Worked out examples .....	89
13.2	Application range .....	89
13.3	Regulation use .....	89
13.4	Validation test .....	90
13.5	Quality issues .....	90
Annex A (informative) Input and method selection data sheet -- Template .....		91
Annex B (informative) Input and method selection data sheet -- Default choices .....		93
Annex C (informative) Common subscripts .....		101
Annex D (informative) Calculation of measured energy performance .....		108
Annex E (informative) Calculation methods for energy performance indicators per part of a building and/or service .....		109
Annex F (informative) Alphabetic index of terms .....		116
Annex G (informative) Electrical grid related indicators .....		117
Annex H (informative) Proposal of indicators for the assessment of nearly Zero-Energy Buildings (NZEB) .....		118
Annex I (informative) Lighting systems .....		121
Annex J (informative) Calculation examples .....		123
Annex K (informative) Flow diagram .....		170
Annex L (informative) List of technologies .....		174
Bibliography .....		178