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Level(s) – A common EU framework of core sustainability indicators for office and residential buildings

User manual 2: Setting up a project to use the Level(s) common framework

(Publication version 1.1)

Nicholas Dodd, Shane Donatello,
Mauro Cordella (JRC, Unit B.5)

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European Commission
Joint Research Centre
Directorate B, Growth and Innovation
Unit 5, Circular Economy and Industrial Leadership

Contact information
Shane Donatello
Address: Edificio Expo. c/ Inca Garcilaso, 3. E-41092 Seville (Spain)
E-mail: jrc-b5-levels@ec.europa.eu
https://ec.europa.eu/jrc
https://susproc.jrc.ec.europa.eu/product-bureau/product-groups/412/home

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Title

Level(s) – A common EU framework of core sustainability indicators for office and residential buildings, User manual 2: Setting up a project to use the Level(s) common framework (Publication version 1.1);

Abstract

Developed as a common EU framework of core indicators for assessing the sustainability of office and residential buildings, Level(s) can be applied from the very earliest stages of conceptual design through to the projected end of life of the building. As well as environmental performance, which is the main focus, it also enables other important related performance aspects to be assessed using indicators and tools for health and comfort, life cycle cost and potential future risks to performance.

Level(s) aims to provide a common language of sustainability for buildings. This common language should enable actions to be taken at building level that can make a clear contribution to broader European environmental policy objectives. It is structured as follows:

1. Macro-objectives: An overarching set of 6 macro-objectives for the Level(s) framework that contribute to EU and Member State policy objectives in areas such as energy, material use, waste management, water and indoor air quality.
2. Core Indicators: A set of 16 common indicators, together with a simplified Life Cycle Assessment (LCA) methodology, that can be used to measure the performance of buildings and their contribution to each macro-objective.

In addition, the Level(s) framework aims to promote life cycle thinking. It guides users from an initial focus on individual aspects of building performance towards a more holistic perspective, with the aim of wider European use of Life Cycle Assessment (LCA) and Life Cycle Cost Assessment (LCCA) methods.

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Figure 1. The Level(s) document structure

How this Level(s) user manual works

If you are new to the assessment of building sustainability, we recommend reading **UM1** before this second part (**UM2**). The **UM2** provides the information you will need to set up and apply Level(s) to your building project. The information provided in **UM2** can be used to brief project team members, clients and stakeholders. It provides instructions on how to

- Establish a **Level(s) project plan**: How to plan the use of Level(s) on your project, including information on:
  - Which macro-objectives and indicators to work with,
  - How to select the level to work at, and
  - Planning when and how Level(s) will be used and who will need to be involved.
- Complete the **building description**: How to compile the basic information that is required to describe the building project. You will need this when setting up your Level(s) project plan.

1. Establish a Level(s) project plan

The first step in the recommended process of using Level(s) is to establish a project plan. The aim of the project plan is to:

- Define which sustainability macro-objectives the project will address,
- Identify which indicators will be used to assess performance against,
- Establish to which 'level' project performance will be assessed, and
- Plan what resources will be needed to assess performance and when in the project life cycle.

Step 1: Select the macro-objectives and indicators to address

In this first step, you will need to decide which sustainability macro-objectives the building project will address. Under each macro-objective, you will need to make a selection of the indicators that you intend to use to assess and report on the performance of the building project. In Table 1 you can find an overview of the macro-objectives and the associated indicators from which you can choose.

Table 1. Overview of the macro-objectives and their corresponding indicators

Macro-objective	Indicator	Unit of measurement	Summary information
1: Greenhouse gas and air pollutant emissions along a building's life cycle	1.1 Use stage energy performance	kilowatt hours per square metre per year (kWh/m^2/yr)	This indicator measures the primary energy demand of a building in the use stage. In a life cycle approach, this energy demand is also referred to as 'operational energy consumption'. It takes into account the benefits of generating low carbon or renewable energy.
	1.2 Life cycle Global Warming Potential	kg CO_2 equivalents per square metre per year (kg CO_2 eq./m^2/yr	This indicator measures the greenhouse gas (GHG) emissions associated with the building at different stages in its life cycle. It therefore measures the building's contribution to emissions that cause the earth's global warming or climate change. This is sometimes also referred to as a 'carbon footprint assessment' or 'whole life carbon measurement'.
2. Resource efficient and circular material life cycles	2.1 Bill of quantities, materials and lifespans	Unit quantities, mass and years	This indicator measures the quantities and mass of construction products and materials necessary to complete defined parts of the building. It also allows for the estimation of the lifespans of defined parts of the building.
	2.2 Construction & demolition waste and materials	kg of waste and materials per m^2 total useful floor area	This indicator measures the overall quantity of waste and materials generated by construction, renovation and demolition activities. This is then used to calculate the diversion rate to reuse and recycling, in line with the waste hierarchy.
	2.3 Design for adaptability and renovation	Adaptability score	The indicator assesses the extent to which the design of a building could facilitate future adaptation to changing occupier needs and property market conditions. It therefore provides a proxy for the capacity of a building to continue to fulfil its function and for the possibility to extend its useful service life into the future.
	2.4 Design for deconstruction, reuse and recycling	Deconstruction score	The indicator assesses the extent to which the design of a building could facilitate the future recovery of materials for reuse of recycling. This includes assessment of the ease of disassembly for a minimum scope of building parts, followed by the ease of reuse and recycling for these parts and their associated sub-assemblies and materials.
3. Efficient use of water resources	3.1 Use stage water consumption	m^3/yr of water per occupant	The indicator measures the total consumption of water for an average building occupant, with the option to split this value into potable and non-potable water that is supplied. It also supports the identification of water scarce locations.
1-3. Full LCA	n/a	10 impact categories	-Climate change; Ozone depletion; Acidification; Eutrophication aquatic freshwater; Eutrophication aquatic marine; Eutrophication terrestrial; Photochemical ozone formation; Depletion of abiotic resources - minerals and metals; Depletion of abiotic resources – fossil fuels; Water use
	4.1 Indoor air quality	Parameters for ventilation, CO2 and humidity	The indicator measures a combination of indoor air conditions and target air pollutants:

Macro-objective	Indicator	Unit of measurement	Summary information
4. Healthy and comfortable spaces		Target list of pollutants: TVOC, formaldehyde, CMR VOC, LCI ratio, mould, benzene, particulates, radon	- The design indoor air conditions relate to the ventilation rate and how this is adjusted to keep CO_2 and humidity at healthy levels. - The target air pollutants can be controlled by selecting and reporting on low pollutant fit out materials, controlling the risk of mould growth and specifying ventilation systems with adequate filters for polluted outside air.
	4.2 Time outside of thermal comfort range	% of the time out of range during the heating and cooling seasons	The indicator measures the proportion of time during the year when building occupiers are comfortable with the indoor thermal conditions. It measures the ability of a building (with & without building services) to maintain pre-defined thermal comfort specs during hot & cold weather.
	4.3 Lighting and visual comfort	Level 1 checklist	The indicator measures the availability and quality of light, considered in terms of a combination of installed electric lighting systems and the penetration of natural light into a building.
	4.4 Acoustics and protection against noise	Level 1 checklist	This indicator measures the potential for disturbance from unwanted noise in the form of impact and airborne transmission of sound between residential dwellings and office spaces, reverberation sound in office spaces and in both types of building external sources of noise disturbance.
5. Adaptation and resilience to climate change	5.1 Protection of occupier health and thermal comfort	Projected % time out of range in the years 2030 and 2050 (see also indicator 4.2)	This indicator measures the potential for a deviation of the thermal comfort conditions simulated using projected weather conditions in 2030 and 2050 from present conditions. The indicator relies on the same methodology as indicator 4.2.
	5.2 Increased risk of extreme weather events	Level 1 checklist (under development)	This indicator assesses the potential for extreme weather events in the future (e.g. storms, rainfall, snowfall, and heatwaves) and their impact on the service life of a building component or material.
	5.3 Increased risk of flood events	Level 1 checklist (under development)	This indicator measures the potential risk of future flood events and how the building design may contribute to an increase or decrease of the risk of pluvial and fluvial flooding, both in the immediate vicinity of the building site and in downstream locations.
6. Optimised life cycle cost and value	6.1 Life cycle costs	Euros per square metre per year (€/m2/yr)	The indicator measures all building element costs incurred at each life cycle stage of a project for the reference study period and, if defined by the client, the intended service life.
	6.2 Value creation and risk exposure	Level 1 checklist	This indicator assesses the potential for the building design to have a positive influence on property valuations and risk ratings in three main areas: - Reduced overheads (by minimising operational costs). - Increased revenues and more stable investments (by making properties more attractive). - Reduced risk (by anticipating potential future exposure).

Step 2: Decide to which 'level' project performance will be assessed

In this second step, you will need to decide on the level of commitment of the client, the project team and contractors to assess the performance of a building project. You can then complete the project planning matrices 1 and 2 (see Table 3 and Table 5 later).

There are three 'levels' which represent a progression from the initial concept through to detailed design, construction, completion and occupation. The more levels that can be addressed, the more accurate will be the picture of the projects' performance, including any gaps between design and the reality of the completed building. To help you in deciding at which level to work, more information is provided later in this step.

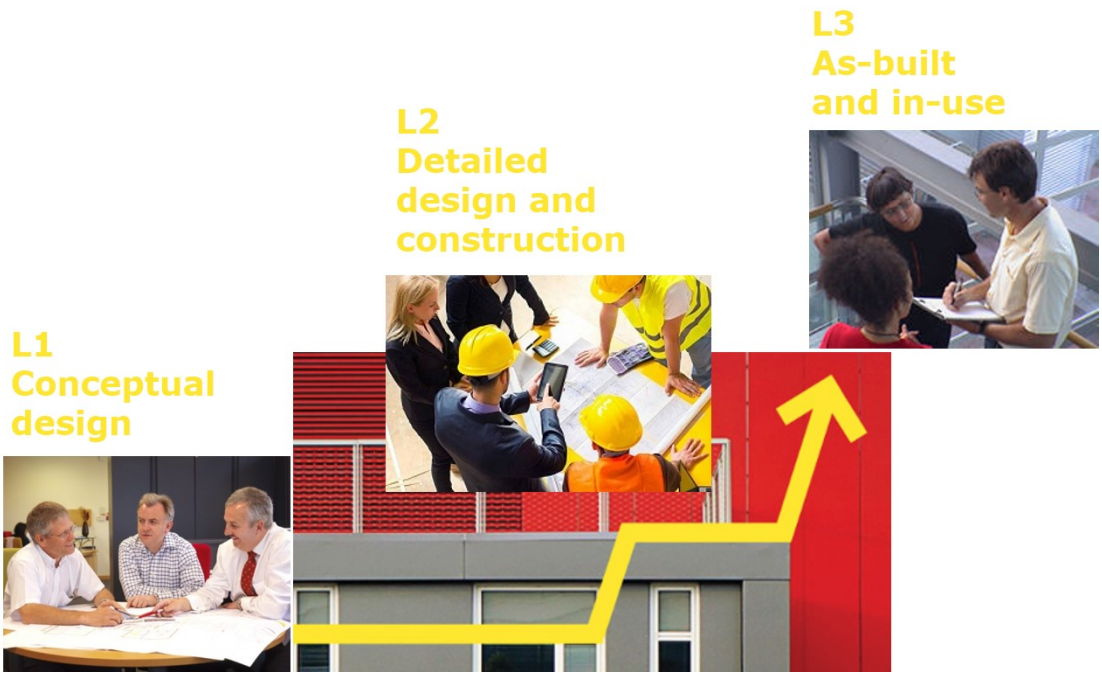

Figure 2. The levels – from conceptual design to in-use performance

The levels are designed to map onto the typical sequence of stages that are followed in a building project. Table 2 identifies the indicative project stages that are associated with each level. In this way, it can be useful to understand how and when different activities at each of these stages will contribute to the application of Level(s) to the project.

Table 2. Indicative project stages associated with each Level

Level 1 Conceptual design	Level 2 Detailed design and construction	Level 3 As-built and in-use
L1a. Project definition and brief L1b. Concept design	L2a. Outline design (spatial planning and permitting) L2b. Detailed design (tendering) L2c. Technical design (construction)	L3a. As-built design L3b. Commissioning and testing L3c. Completion and handover L3d. Occupation and use

The instructions for using each indicator of Level(s) can be found in the corresponding individual indicator user manuals. Where relevant, they identify assessment activities and reporting related to each of these stages. For example, for indicator 4.1. Indoor air quality, air quality monitoring is specified to take place post-completion (Level 3: L3c) whereas selection of construction products based on pollutant emissions takes place at design stage (Level 2: L2a-c).

Learn more about:

What the levels are and how they work

The common framework is organised into three levels. The levels provide a choice as to how advanced the reporting on sustainability for the project will be. The three levels represent the following stages in the execution of a building project:

- **Level 1.** The **conceptual design** for the building project – the simplest level as it entails early stage qualitative assessments on the basis for the conceptual design and reporting on the concepts that have or are intended to be applied.
- **Level 2.** The **detailed design and construction** performance of the building – an intermediate level as it entails the quantitative assessment of the designed performance and monitoring of the construction according to standardised units and methods.
- **Level 3.** The **as-built and in-use** performance of how the building performs after completion and handover to the client – this is the most advanced level as it entails the monitoring and surveying of activity both on the construction site and of the completed building and its first occupants.

The basic idea is that the levels represent a professional journey from the initial concept through design, construction and then, after handover, to the reality of the completed building. Progression up the levels also represents an increase in the accuracy and reliability of the reporting – the higher the level, the closer the reported results will be to providing you with data that reflects the performance of the building as-built and in-use.

You can then, according to the needs and priorities of the project, choose to:

- ✓ work only at one level (for example, just working at level 1 and applying design concepts to the project),
- ✓ up to a specific level (for example, by working from level 1 through to 2, calculating the performance of design concepts that have been used), or
- ✓ to combine certain levels (for example, by working at level 1 and then later monitoring performance at level 3).

At each level that you choose to work, reporting can be done. You may wish to work at different levels for each indicator. In choosing the level, you will therefore also be choosing how far along the project performance will be tracked and reported.

Table 3. Level(s) project plan matrix 1: identifying which levels you will work at and when assessment activities will take place[1]

Macro-objective		Indicators	Level 1 Conceptual design	Level 2 Detailed design and construction	Level 3 As-built and in-use
Macro-objective 1 **Greenhouse gas and air pollutant emissions along a buildings life cycle**		1.1. Use stage energy performance			
		1.2. Life cycle Global Warming Potential			
Macro-objective 2: **Resource efficient and circular material life cycles**		2.1. Bill of quantities, materials and lifespans			
		2.2. Construction & demolition waste and materials			
		2.3. Design for adaptability and renovation			
		2.4. Design for deconstruction, reuse and recycling			
Macro-objective 3: **Efficient use of water resources**		3.1. Use stage water consumption			
		4.1. Indoor air quality			

[1] For each indicator: (i) identify which level you will work at (if any) and (ii) at which project stages the activity assessment will need to take place (see project stages defined in Table 2 for guidance)

Macro-objective		Indicators	Level 1 Conceptual design	Level 2 Detailed design and construction	Level 3 As-built and in-use
Macro-objective 4: **Healthy and comfortable spaces**		4.2. Time outside of thermal comfort range			
		4.3. Lighting and visual comfort			
		4.4. Acoustics and protection against noise			
Macro-objective 5: **Adaptation and resilience to climate change**		5.1. Protection of occupier health and thermal comfort			
		5.2. Increased risk of extreme weather events			
		5.3. Increased risk of flood events			
Macro-objective 6: **Optimised life cycle cost and value**		6.1. Life cycle costs			
		6.2. Value creation and risk exposure			

Level 1: The conceptual design for the building project

This level is intended to provide a simple and accessible entry point for the use of each indicator. Assessments made at this level are qualitative, meaning that they are based on whether the design concept addresses any of a series of suggested design aspects or not. The aspects provided for each indicator are proxies for improved performance and have been selected based on scientific evidence.

The basic rules for reporting at Level 1:

- ✓ It is recommended to first complete a Level(s) **project plan,** following steps 1-3
- ✓ Specify which **design concepts** have been addressed, with the reference to the checklists and using the format provided for each indicator user manual.
- ✓ For **renovation** projects, report on the baseline survey, using the format provided

Optional additional step

- ✓ Select and report on the **results** of steps that go further, as provided in the instructions for each indicator.

Level 2: The detailed design and construction of the building

This level is intended to provide a common basis for quantifying the performance of building designs. It is therefore more technically challenging than Level 1, requiring more knowledge, tools and expertise. For each indicator, common units of measurement, together with reference calculation methods are provided.

The basic rules for reporting at Level 2:

- ✓ It is recommended, if you have not already done so, to first complete a Level(s) **project plan,** following steps 1-3
- ✓ Complete the **building description,** following the instructions in briefing 2.2
- ✓ For **renovation** projects, report on the baseline survey, using the format provided
- ✓ Report on the **results** of the assessment of each indicator, using the format provided in each indicator user manual
- ✓ Report on the **method** used and the main **assumptions** for each indicator, again using the format provided in each indicator user manual.

Optional additional steps

- ✓ Select and report on the **results** of recommended optimisation steps provided in the instructions for each indicator, if available.

Level 3: The as-built and in-use performance of the building after completion and handover to the client

This level is intended to collect data on the real performance of the building/ building project. Depending on the indicator, this may be from the demolition and construction site or the completed building. Collection of the data therefore requires careful planning and timing to ensure it occurs at the right point in the project and that responsibilities are correctly assigned. By taking the optional step of commissioning occupant surveys for some indicators, a thorough understanding of the buildings performance can be obtained.

The basic rules for reporting at Level 3:

- ✓ It is recommended, if you have not already done so, to first complete a Level(s) **project plan,** following steps 1-3

- ✓ If you have not already done so, complete the **building description,** following the instructions in briefing 2.2
- ✓ Report on the **results** of the assessment of each indicator, using the format provided in each indicator user manual
- ✓ Report on the **method** used and the **sampling** strategy used for each indicator, again using the format provided in each indicator user manual.

Optional additional step

- ✓ Select and **report** on the use of any of the recommended optimisation steps to improve the granularity and reliability of the results, if available.
- ✓ Report on the **results** of surveys of occupant satisfaction.

Step 3: Planning the workflow requirement to make Level(s) assessments

The greatest value can be obtained by fully integrating Level(s) into the management of the building project workflow. In this way, sustainability will become a key priority for the building project alongside factors such as cost and yield. An effective planning of the workflow in order to use Level(s) is important for a number of reasons:

- ✓ Specific **roles and responsibilities** will need to be assigned within the project team
- ✓ Specific **training or expertise** may be required, dependant on the different aspects of performance to be assessed
- ✓ The **information and data** required to make assessments will need to be managed
- ✓ Key activities relating to Level(s) will have specific **requirements and deadlines** for when they will need to take place.

As part of the project plan, we recommend completing the project plan matrix 1 (see Table 3) and matrix 2 (see Table 5) by answering the planning questions in Table 4 and providing more detail for each indicator in the matrices . This will enable an effective planning and integration into the project of Level(s) assessments.

Table 4. Level(s) project plan: planning associated with key workflow items

Workflow items	***Planning required***	***Project team response***
Level(s) performance assessments	- Has the team received a briefing on Level(s) and how it will be used?	
	- Have milestones been established by the team for each indicator assessment?	
	- To whom will responsibilities for making each indicator assessment be assigned?	
	- Who will co-ordinate the Level(s) indicator assessments?	
	- Does the team have the training and expertise to make all the Level(s) assessments? - If not, how will the gaps be bridged?	
Information and data management	- How will the flow of information and data required to make each indicator assessment be managed?	
	- Will BIM be used and if so how could it support Level(s) assessments?	

Workflow items	*Planning required*	*Project team response*
Renovation baseline	- Will it be a major renovation project? - If so, how comprehensive is it planned to be?	
	- How will the baseline survey of the building and its fabric be carried out?	
	- What information will be needed from the baseline survey in order to make the indicator assessment?	
Property market valuation	- How will Level(s) indicator performance aspects be taken into account in the buildings market valuation?	
	- How and at what points in the project will dialogue be established between the project team and the valuer?	
External verification	- Will third party verification of the level(s) assessment results be required? - If so, by whom and at what point in the project?	

Table 5. Level(s) project plan matrix 2: identifying needs, assigning responsibility and managing information[2]

Macro-objective		Indicators	Level 1 Conceptual design	Level 2 Detailed design and construction	Level 3 As-built and in-use
Macro-objective 1 **Greenhouse gas and air pollutant emissions along a buildings life cycle**		1.1 Use stage energy performance			
		1.2 Life cycle Global Warming Potential			
Macro-objective 2: **Resource efficient and circular material life cycles**		2.1 Bill of quantities, materials and lifespans			
		2.2 Construction & demolition waste and materials			
		2.3 Design for adaptability and renovation			
		2.4 Design for deconstruction, reuse and recycling			
Macro-objective 3: **Efficient use of water resources**		3.1 Use stage water consumption			
		4.1 Indoor air quality			

[2] For each indicator: (i) identify what level of expertise is required; (ii) who will be responsible for the assessment? And (iii) How, and by whom, will the information and data be managed?

Macro-objective		Indicators	Level 1 Conceptual design	Level 2 Detailed design and construction	Level 3 As-built and in-use
Macro-objective 4: **Healthy and comfortable spaces**		4.2 Time outside of thermal comfort range			
		4.3 Lighting and visual comfort			
		4.4 Acoustics and protection against noise			
Macro-objective 5: **Adaptation and resilience to climate change**		5.1 Protection of occupier health and thermal comfort			
		5.2 Increased risk of extreme weather events			
		5.3 Increased risk of flood events			
Macro-objective 6: **Optimised life cycle cost and value**		6.1 Life cycle costs			
		6.2 Value creation and risk exposure			

2: Complete the building description

An important part of working at level 2 and 3 is the completion of the building description. It's role is to provide a transparent basis for comparing the performance of different buildings. The information in the building description will also be used to normalise and obtain the results for several of the indicators.

The type of information that will be needed to complete the building description is summarised in Table 6, while a more detailed specification of what is required is provided in the "*Level(s) building description reporting format*" (see Table 7). Further guidance and lookup tables that will aid in completing the description can be found in the building description technical guidance that follows this section of the user manual.

Table 6. Overview of the information required to complete the Level(s) building description

Description	Information required
1. Location and climate	1.1 The country and region in which the building is located 1.2 Heating and cooling degree days 1.3 The climatic zone in which the building is located
2. The building typology and age	2.1 The project type 2.2 The year of construction 2.3 The market segment
3. How the building will be used	3.1 The intended conditions of use 3.2 Building occupation and usage patterns 3.3 The intended (or required) service life
4. The building model and characteristics	4.1 The building form 4.2 The total useful floor area within the building and measurement standard used 4.3 The scope of building elements to be assessed and categorisation system used

For those indicators that take a life cycle perspective – namely indicator 1.2 Life cycle GWP, Cradle to grave LCA (Life Cycle Assessment) and 6.1 Life cycle cost - the information provided in the building description forms an essential part of the Level(s) assessment and will be used to define what is referred to in LCA terminology as the '*goal and scope*'. To help you understand further this relationship a guide is provided below to the technical terms used in association with these life cycle indicators and where you can find the corresponding information.

Learn more about:

Relating information in the building description to technical terms used with life cycle-based indicators

- Object of the assessment: A physical description of the building and the scope of building elements that will be assessed (*see 4. The building model*).
- Functional unit of equivalence: The required technical characteristics and functionalities of the building (*see 2 The building type and 3. How the building will be used*).
- Reference unit: The common unit for normalising results in order to enable comparisons, which is the environmental impact per 1 m^2 of total useful floor area (*see under 4. the building model*)
- Reference in-use conditions: The anticipated patterns of occupation and use of the building (*see under 3. How the building will be used*).
- Required service life: The service life required by the client, which may not be the same as the reference service life for Level(s) assessments, which is 50 years (*see under 3. How the building will be used*).

- Other characteristics: There are other variables such as the climate or the required service life of the building elements that influence a buildings performance over time.

Table 7. Level(s) building description reporting format

Parameter	Office buildings	Residential buildings
1. Location	**1.1 Country and region**	
	1.2 Heating and cooling degree days	
	1.3 Climate zone	
2. The building typology and age	**2.1 New build or major renovation**	
	2.2 The year of construction	
	2.3 Market segment - Owner occupation or for rent - BOMA building class [3]: *Type of ownership:* - *Investment* - *Institutional* - *Speculative* - *Owner occupation* *Type of rental (where applicable)* *A: Premium rental* *B: Average rental* *C: Below average rental*	**2.3 Market segment** *By form of tenure* - Owner occupation - Leasehold, social - Leasehold, market rental - Leasehold, student - Leasehold, seniors - Other *(to be described)*
3. How the building will be used?	**3.1 Conditions of use** *As defined for the purpose of calculating the building's energy performance requirements (as per the national calculation method)*	
	3.2 Building occupation and usage patterns ***3.2.1 Projected occupancy density*** *Area of workspace in m² per full time person equivalents* ***3.2.2 Projected pattern of occupation*** *Number of hours and days per year*	*Not applicable*
	3.3 The intended (or required) service life *The clients intended service life or investment holding period in years (to be specified which)*	**3.3 The intended (or required) service life** *The clients intended service life or investment holding period or, alternatively, the warrantied service life of the property for sale.*
4. The building model and characteristics	**4.1 The building form** *Please select from* - Low rise office park - In-fill urban block - Perimeter urban block - Urban city block - Tower/skyscraper	**4.1 The building form** *Please select from:* - Free standing, detached house - Semi-detached house - Row or terraced house - Multi-family house or apartment block

[3] BOMA (Building Owners and Managers Association), Building class definitions, http://www.boma.org/research/Pages/building-class-definitions.aspx

Parameter	Office buildings	Residential buildings
	- *Other (to be described)*	*(up to 4 floors/5-9 floors/more than 9 floors)*
	4.2 Total useful floor area *<u>Reference standard for the purpose of calculations</u>: IPMS Office 3* *(if another standard is used this should be clearly specified)*	**4.2 Total useful floor area** *Schedule of accommodation for the development or renovated stock, providing the following information:* - *Number of residential units per typology and by bedspaces* - *Net useful floor area of each residential unit type in the schedule:* *<u>Reference standard for the purpose of calculations:</u> IPMS Residential 3c (if another standard is used this should be clearly be specified)*
	4.3 The scope of building elements to be assessed and the categorisation system used ***4.3.1 The scope of building elements to be assessed*** *- Any deviations from the Level(s) default building element scope shall be reported* ***4.3.2 The building element categorisation system used*** *- The national, industry-specific or BIM system used to categorise and organise the building element information shall be reported*	

Table 8. Level(s) building description reporting format (blank so it can be filled out)

Parameter		Office buildings	Residential buildings
1. Location	1.1 Country and region		
	1.2 Heating and cooling degree days		
	1.3 Climate zone		
2. Building typology and age	2.1 New build or major renovation		
	2.2 The year of construction		
	2.3 Market segment		
3. How the building will be used	3.1 Conditions of use		
	3.2 Building occupation and usage patterns *3.2.1 Projected occupancy density* *3.2.2 Projected pattern of occupation*		*Not applicable*
	3.3 The intended (or required) service life		
4. The building model and characteristics	4.1 The building form		
	4.2 Total useful floor area		
	4.3 The scope of building elements to be assessed and the categorisation system used *4.3.1 The scope of building elements to be assessed* *4.3.2 The building element categorisation system used*		

3. Guidance and further information to help complete the building description

In this part of user manual 2, supplementary guidance is provided on how to complete the building description, with a focus on the following building description parameters:

- 1.2: Heating and cooling degree days
- 1.3: Climate zone
- 2.1: New-build or major renovation
- 3.1: Conditions of use
- 3.2: Building occupation and use patterns
- 3.3: The intended (or required) service life
- 4.2: Total useful floor area
- 4.3 The scope of building elements to be assessed and the categorisation system used

Building description parameter 1.2: Heating and cooling degree days

According to Eurostat, heating and cooling degree days are defined as following:

- The heating degree day (HDD) index is a weather-based technical index designed to describe the need for the heating energy requirements of buildings below 15ºC.
- The cooling degree day (CDD) index is a weather-based technical index designed to describe the need for the cooling (air-conditioning) requirements of buildings above 24ºC.

HDD and CDD values can be obtained for any EU location using the JRC PVGIS Typical Meteorological Year tool [4].

Building description parameter 1.3: Climate zone

In order to make comparisons between buildings across the EU, it is necessary to define reference climatic conditions. This is because there are important regional and sub-regional variations in climate and some parts of Member States may have comparable climate zones to other zones e.g. the north of Spain and Italy.

For the zoning of locations or cities, the heating and cooling degree day thresholds in Table 9 shall be used. This zoning enables any location in the EU to be classified. For example, Palermo falls into zone 1, which is defined by having more than 1200 cooling degree days and less than 1500 heating degree days.

Table 9. Climate zones and corresponding heating and cooling degree-day ranges[5]

Climate zone	Parameters		Representative cities
	Heating degree days	Cooling degree days	
Zone 1	<1500	>1200	Athens - Larnaca - Luga - Catania – Seville - Palermo
Zone 2	<1500	>800 - 1200	Lisbon - Madrid - Marseille - Rome
Zone 3	>1500-3000	400-800	Bratislava - Budapest - Ljubjana - Milan - Vienna
Zone 4	>1500-3000	<400	Amsterdam - Berlin – Brussels - Copenhagen - Dublin - London - Macon - Nancy - Paris - Prague - Warszawa
Zone 5	>3000	<400	Helsinki - Riga - Stockholm – Gdansk - Tovarene

Building description parameter 2.1: New-build or major renovation

"*Major renovation*" is defined in the Energy Performance of Buildings Directive as:

[4] Joint Research Centre, *Photovoltaic Geographical Information System (PVGIS) – TMY generator* https://ec.europa.eu/jrc/en/PVGIS/tools/tmy

[5] From Ecofys (2013) and JRC (2018)

"the renovation of a building where:

(a) the total cost of the renovation relating to the building envelope or the technical building systems is higher than 25 % of the value of the building, excluding the value of the land upon which the building is situated;

or

(b) more than 25 % of the surface of the building envelope undergoes renovation;

Member States may choose to apply option (a) or (b)."

Building description parameter 3.1: Conditions of use

Conditions of use for a building are usually defined by the national calculation method for a building's energy requirements. Default conditions of use are provided in Annex C to EN 16798-1 for different zones within office and residential buildings.

Building description parameter 3.2: Building occupation and use patterns

The projected occupant density of an office building can be estimated by relating the number of workspaces and the floor area taken up by each workspace to the number of Full Time Equivalent staff that will work in the building [6].

Workspace density

Indicative average occupational density ranges as m^2 per workspace are as follows:

- High density of occupation: < 7 m^2 /workspace
- Medium density of occupation: 8 to 13 m^2 /workspace
- Low density of occupation: > 14 m^2 /workspace

Full time equivalent staff

The number of occupants shall be calculated in terms of full-time equivalents. To qualify as a member of staff working in the premises, staff must use the premises as their main base and expect to work there for part of a typical working week. Non-payroll staff, such as staff consultants, contractors, and other outsourced staff shall be converted to full-time equivalents on the following basis:

- Personnel working on a regular basis >30 hours per week: 1.00
- Personnel working on a regular basis 20-30 hours per week: 0.75
- Personnel working on a regular basis 15-20 hours per week: 0.50
- Personnel working on a regular basis <15 hours per week: 0.25

Occupation patterns

Default occupation patterns are provided in Annex C to EN 16798-1 for different zones within office and residential buildings.

[6] Better Buildings Partnership (2010) Sustainability Benchmarking Toolkit for Commercial Buildings Principles for best practice

Building description parameter 3.3: The intended (or required) service life

The reference study period to be used for all buildings assessed according to the Level(s) framework is 50 years. Users may additionally report on the performance of the building for a client's intended service life or investment holding period, which may be shorter or longer than the reference study period.

Building description parameter 4.2: Total useful floor area

The basic reference unit to be used throughout the Level(s) framework is one square metre (m^2) of useful internal floor area.

The International Property Measurement Standards (IPMS) for offices and residential buildings shall be used as the reference standards. The IPMS standards are broadly equivalent to the reference area defined in EN ISO 52000-1, which is a measurement of the net internal area inclusive of shared circulation areas that are within the thermal envelope.

Table 10 identifies the specific IPMS standards that shall be used, together with those items that shall be included or excluded from a floor area measurement exercise. In all cases, the method used shall be reported on for comparative purposes.

Table 10. Reference internal floor area definitions to be used for office and residential buildings[7]

	Office building (IPMS measurement standard 3)	**Residential building (IPMS measurement standard 3B)**
Inclusions	All internal walls and columns within each occupant's exclusive area. Circulation areas within an occupant's exclusive area, and those shared between different occupants. The floor area shall be measured to the internal dominant face of walls or the centre line of common walls shared between tenants.	The area in exclusive occupation, including the floor area occupied by internal walls and columns. The floor area shall be measured to the internal dominant face and the finished surface of all full height internal walls. Fully glazed partitions are not regarded as permanent internal walls.
Exclusions	Those parts of a building providing shared or common facilities that do not change over time: - stairs, - escalators, - lifts and motor rooms, - toilets, - cleaner's cupboards, - plant rooms, - fire refuge areas, and - maintenance rooms.	- Patios - Unenclosed parking areas, which may be measured or defined by the number of spaces - Staircase openings - Voids where the area, including the enclosing wall, is greater than 0.25 m^2.
Separate items	*To be reported separately:* - balconies, - covered galleries, and - rooftop terraces in exclusive use	*To be reported separately:* - Attics, basements and cellars - Balconies and verandas in exclusive use - Enclosed garages - Limits use areas

[7] International Property Measurement Standards Coalition, *International Property Measurement Standards: Office Buildings*, November 2014 and *Residential buildings*, September 2016

Building description parameter 4.3: The scope of building elements to be assessed and the categorisation system used

For consistency, the building shall be defined in terms of a minimum scope of building parts and associated elements from which they are made up. These are set out in Table 11. Construction products that are procured and installed by building occupiers are excluded from the scope.

Table 11. Level(s) minimum scope of building parts and elements[8]

Building parts	Related building elements
Shell (substructure and superstructure)	
Foundations (substructure)	Piles Basements Retaining walls
Load bearing structural frame	Frame (beams, columns and slabs) Upper floors External walls Balconies
Non-load bearing elements	Ground floor slab Internal walls, partitions and doors Stairs and ramps
Facades	External wall systems, cladding and shading devices Façade openings (including windows and external doors) External paints, coatings and renders
Roof	Structure Weatherproofing
Parking facilities	Above ground and underground (within the curtilage of the building and servicing the building occupiers) [9]
Core (fittings, furnishings and services)	
Fittings and furnishings	Sanitary fittings Cupboards, wardrobes and worktops *(where provided in residential property)* Ceilings Wall and ceiling finishes Floor coverings and finishes
In-built lighting system	Light fittings Control systems and sensors
Energy system	Heating plant and distribution Cooling plant and distribution Electricity generation and distribution
Ventilation system	Air handling units Ductwork and distribution
Sanitary systems	Cold water distribution Hot water distribution Water treatment systems Drainage system
Other systems	Lifts and escalators Firefighting installations Communication and security installations Telecoms and data installations

[8] Adapted from: CEN (2011), BCIS (2012), DGNB (2014) and BRE (2016)

[9] If the share of underground car parking (usable area plus traffic area) accounts for more than 25% of the total useful floor area, the traffic area of the underground parking must be subtracted from the total useful floor area.

External works	
Utilities	Connections and diversions Substations and equipment
Landscaping	Paving and other hard surfacing Fencing, railings and walls Drainage systems