GPP criteria for buildings




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Housekeeping rules and general points

- Please have your cameras turned off and micro-phones muted.
- Time is allotted for discussion after each agenda point.
- In order to have a more fruitful exchange, please post your questions in the chat, but please be succinct. We will deal with them in an aggregated manner, prioritising those concerning clarifications and then addressing the remaining ones.
- If you have oral comments or need to expand your point, please request the floor in the chat window and unmute yourself when prompted by the chair.
- Please avoid turning the debate into bilateral discussions between participants.
- The meeting will be recorded for the purposes of writing the minutes.
- The slides will be shared on the JRC website*.

* Here: https://susproc.jrc.ec.europa.eu/product-bureau//product-groups/408/project-plan and/or here: https://susproc.jrc.ec.europa.eu/product-bureau//product-groups/408/documents

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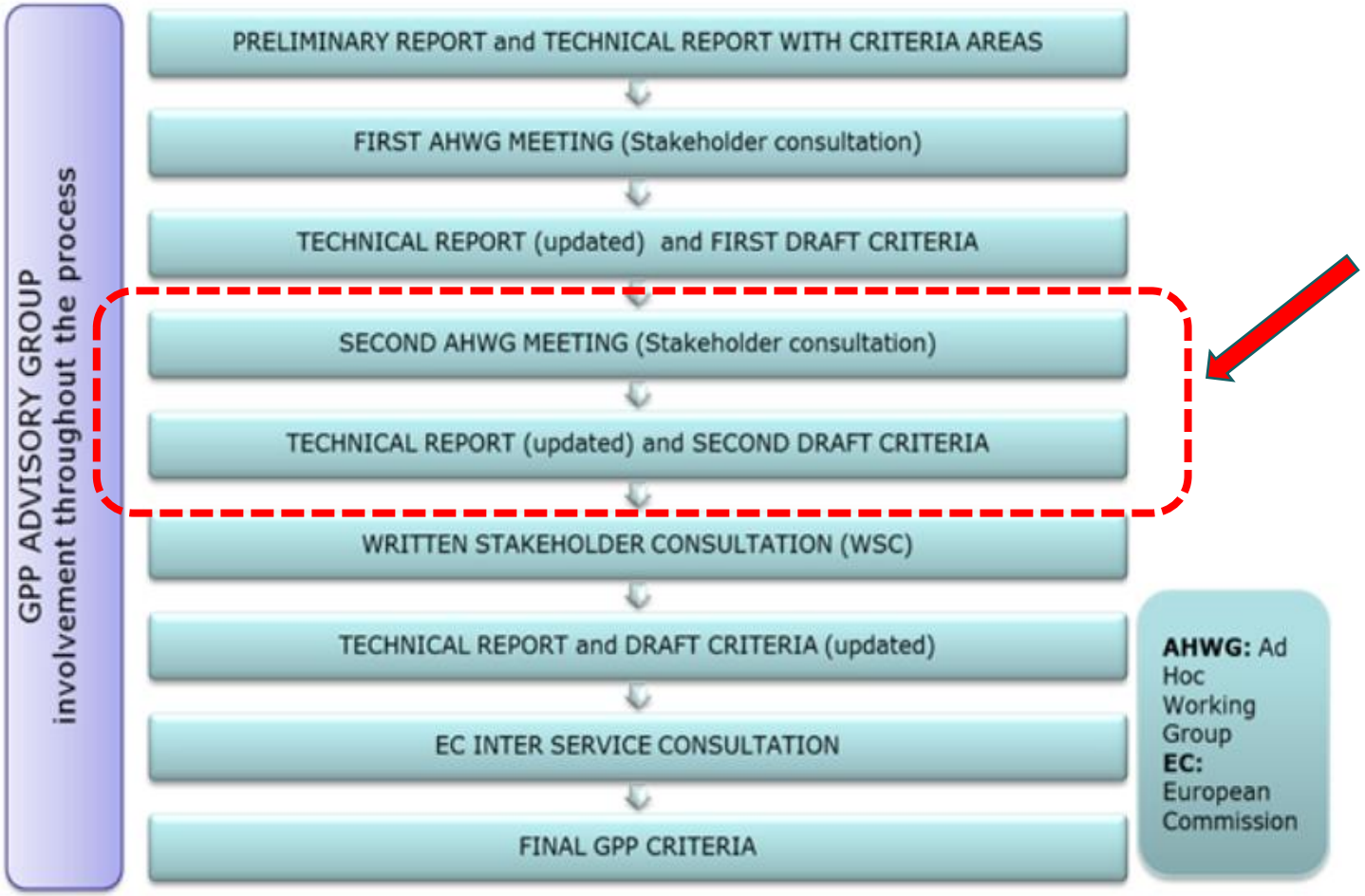
Purpose of this meeting: the process



- To explain our second proposals.
- To clarify (today) and to obtain your reactions (in writing until the 10th July).
- To ensure a transparent and inclusive process.

European Commission

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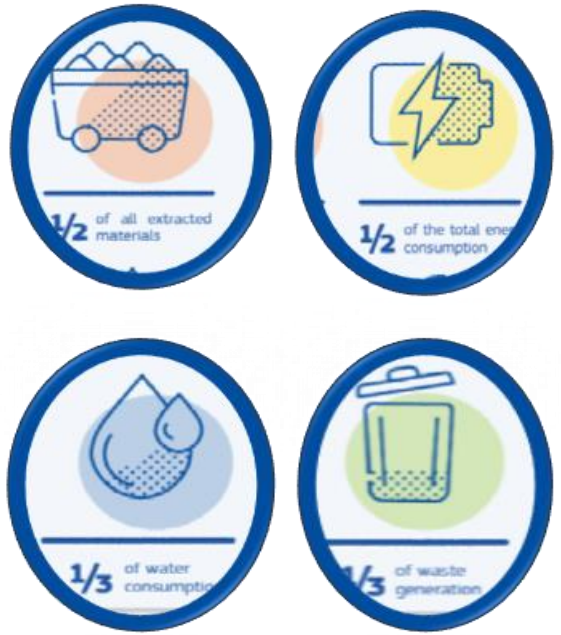
Ambition level

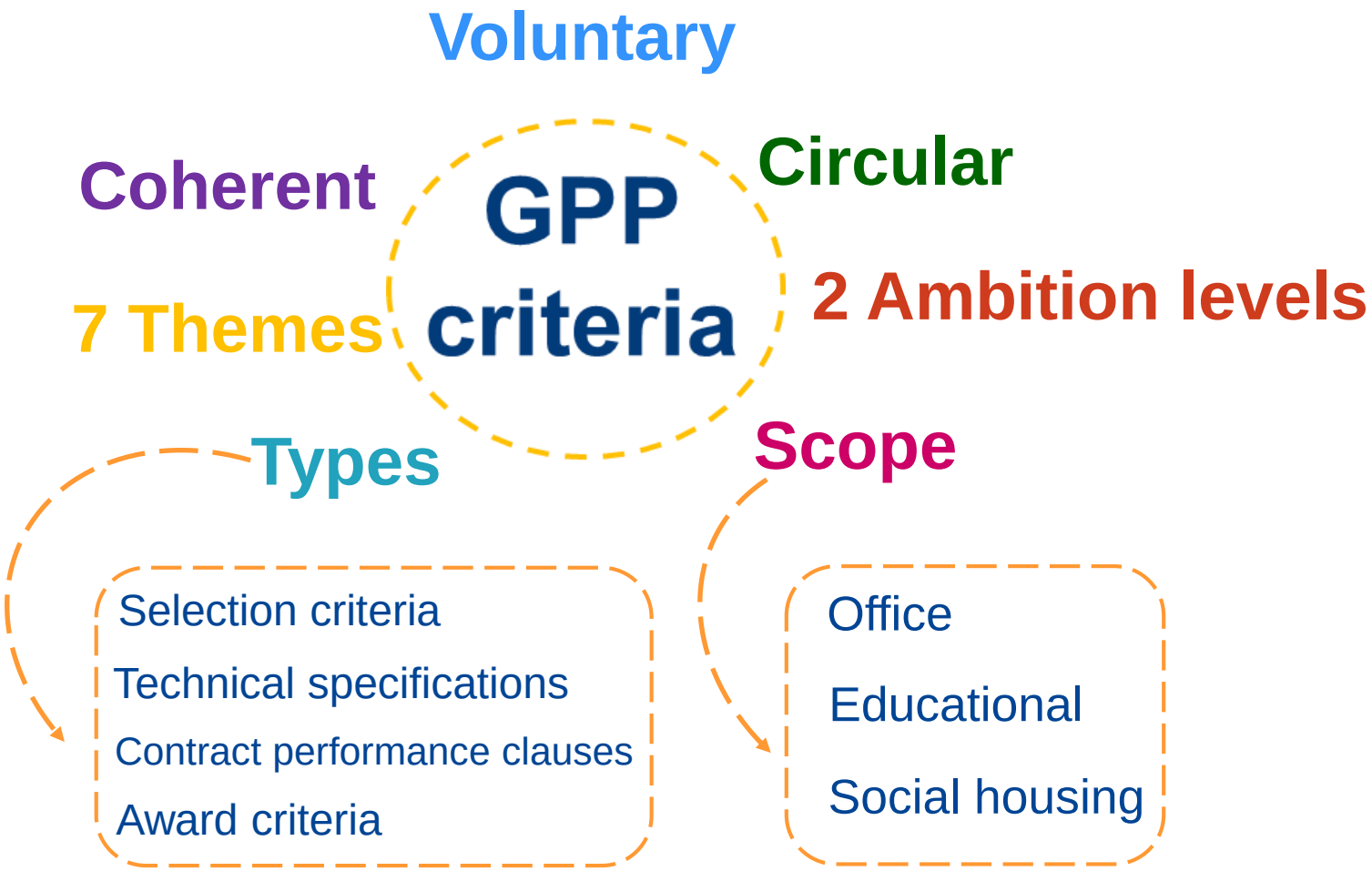
Green deal targets

Climate neutrality 2050

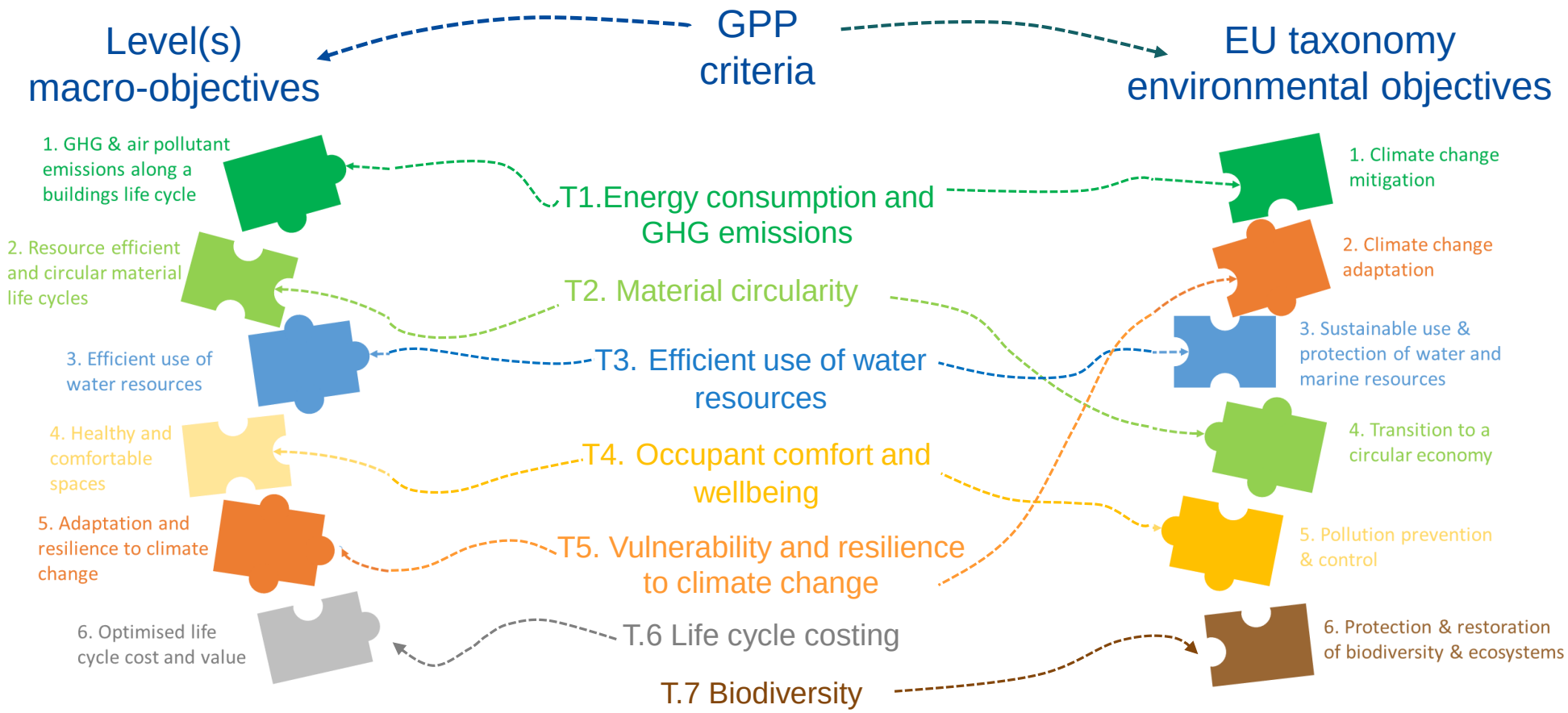


European Commission

GPP buildings criteria at a glance

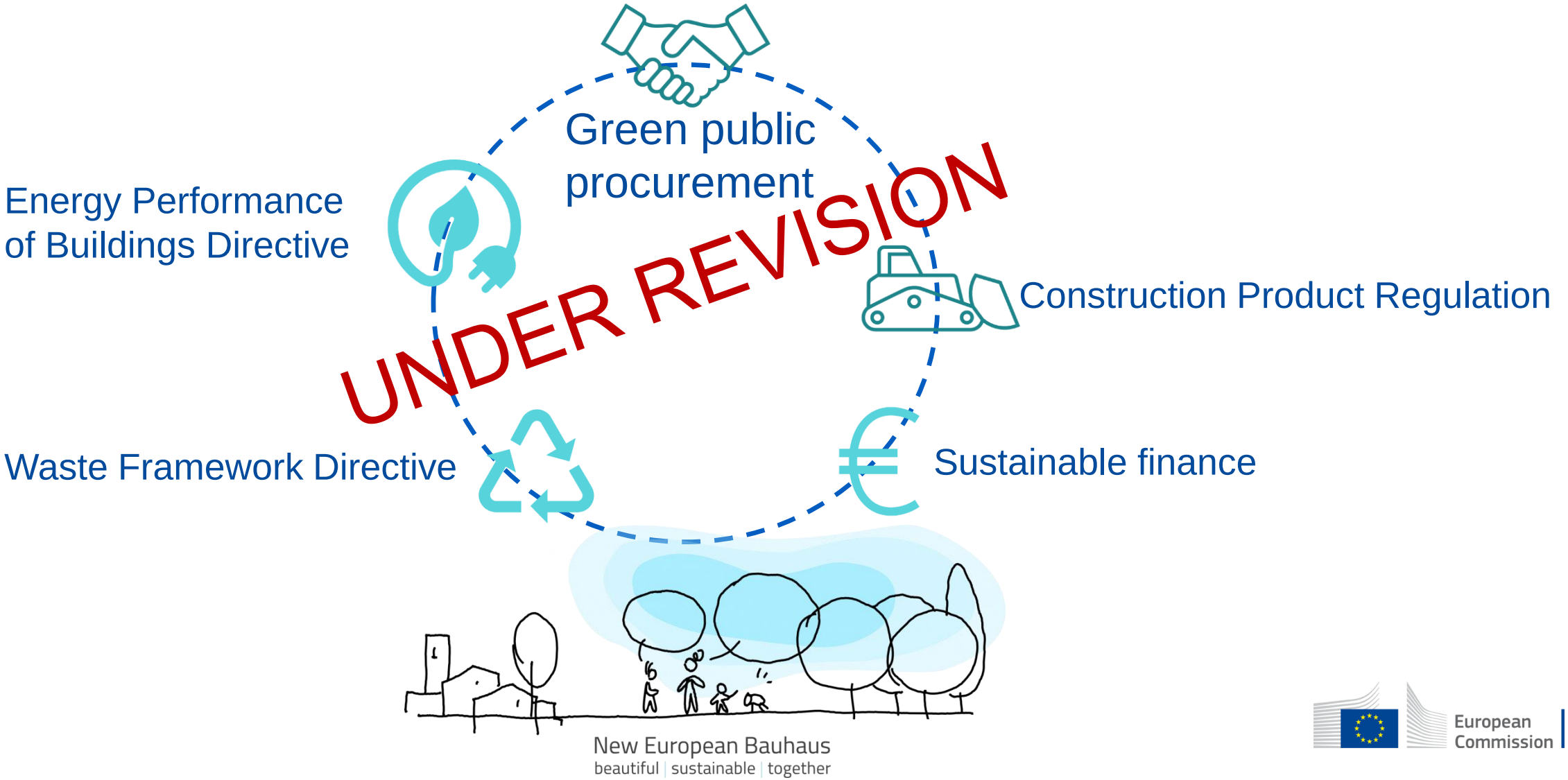


GPP criteria themes



European Commission

Challenge: alignment with the policy framework



European Commission

Updated criteria. General considerations

The rationale of the criteria has been strengthened.

The contributions of (updated) green building rating systems have been considered.

The search for coherence with EU policies has been paramount in the design of the criteria.

New approaches to themes have been considered.

New criteria have been proposed.

The notes at the beginning of the TS have been incorporated into the text to ease the reading.

Only the most important changes for each criterion will be highlighted throughout the presentation.

At this stage the criteria are defined and agreed upon, so they can be refined but no structural changes will be made.

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Selection criteria

Competencies of the project manager
Competencies of the design team
Competencies of the main construction contractor and specialist contractors
Competencies of Design-Build-Operate (DBO) contractors and building managers
Energy Management System

Link to Slido

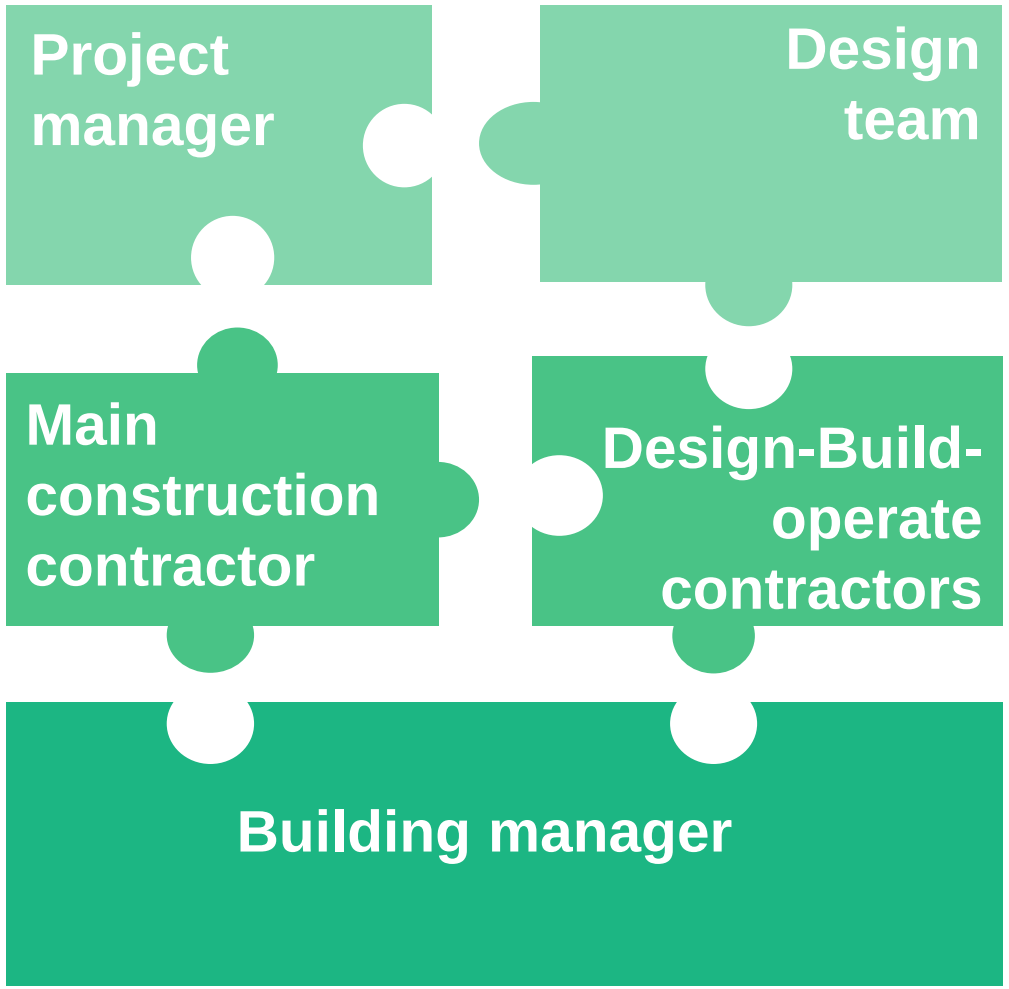
European Commission

Updated criteria. Selection criteria

Actors involved

+

Circularity skills

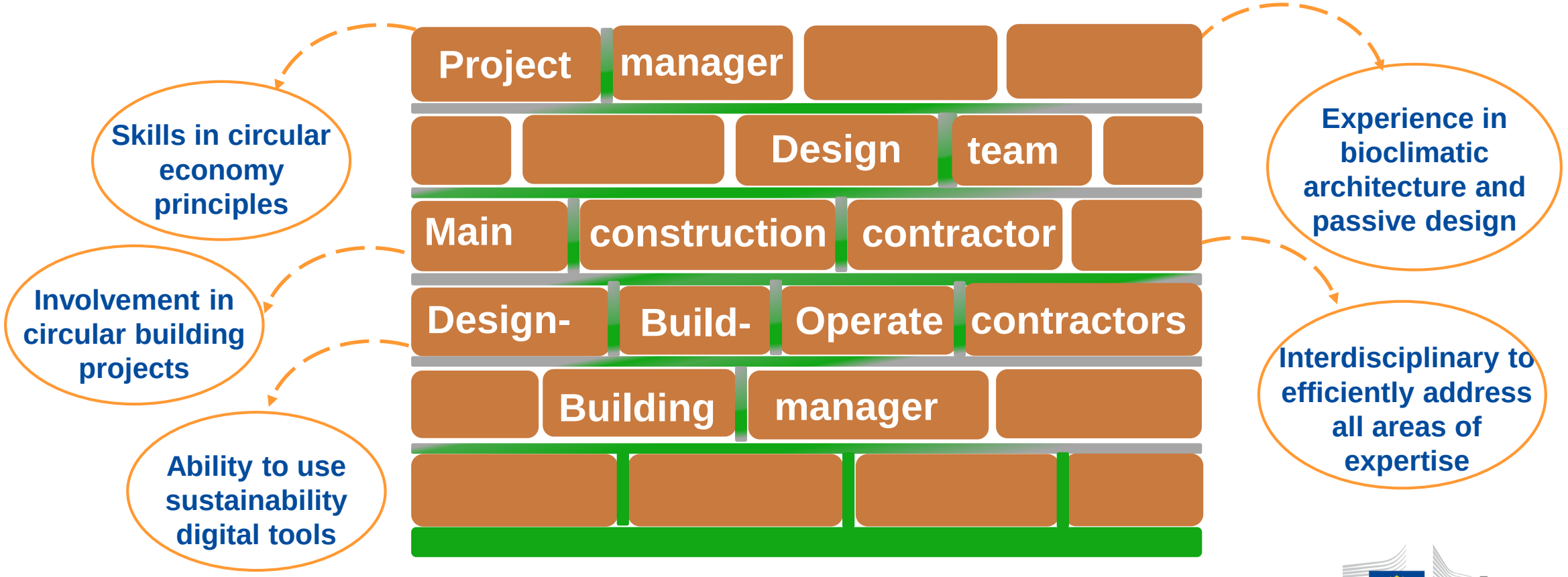


How to best fit the pieces to upskill the sector

European Commission

Updated criteria. Selection criteria

Circularity upskilling / re-skilling of the building sector



Link to Slido

European Commission

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T3. Efficient use of water resources

T4. Occupant comfort and wellbeing

T5. Vulnerability and resilience to climate change

T.6 Life cycle costing

T.7 Biodiversity

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T4. Occupant comfort and wellbeing

T5. Vulnerability and resilience to climate change

T.6 Life cycle costing

T.7 Biodiversity

Updated criteria. Theme 1

T1. Energy consumption and GHG emissions

Use-stage energy consumption

- Overall building performance
- Passive features
- Efficient equipment
- Renewables and BEMS

Whole life cycle assessment

Link to Slido

European Commission

T1. Energy consumption and GHG emissions

TS1.1.1: Use-stage energy consumption

New

Acquisition of buildings

Aligned with EU Taxonomy

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs) AND AWARD CRITERIA (ACs)	
Note: Energy consumption (and associated operational greenhouse gas emissions) are relevant for all types of building project.	
TS1.1.1: Use-stage energy consumption	**TS1.1.1: Use-stage energy consumption**
For the acquisition of buildings: The building shall be within the top 15% of the national or regional building stock expressed as operational primary energy demand. If built after 31 December 2020, the primary energy demand of the building shall be at least 10% lower than the threshold set for nearly zero-energy building (NZEB) requirements in national measures implementing Directive 2010/31/EU. Alternatively, it shall at least reach zero-emission building (ZEB) requirements.	*For the acquisition of buildings*: The building shall be within the top 10% of the national or regional building stock expressed as operational primary energy demand. If built after 31 December 2020, the primary energy demand of the building shall be at least 20% lower than the threshold set for nearly zero-energy building (NZEB) requirements in national measures implementing Directive 2010/31/EU. Alternatively, it shall at least reach zero-emission building (ZEB) requirements.
For new construction projects: The primary energy demand of the building shall be at least 10% lower than the threshold set for nearly zero-energy building (NZEB) requirements in national measures implementing Directive 2010/31/EU. Alternatively, it shall at least reach zero-emission building (ZEB) requirements.	*For new construction projects*: The primary energy demand of the building shall be at least 20% lower than the threshold set for nearly zero-energy building (NZEB) requirements in national measures implementing Directive 2010/31/EU. Alternatively, it shall at least reach zero-emission building (ZEB) requirements.
For renovation projects: The building renovation leads to a reduction of at least ~~30~~ 40% of the primary energy demand of the building or shall reach at least zero-emission building (ZEB) requirements.	*For renovation projects*: The building renovation leads to a reduction of at least 60% of the primary energy demand of the building or shall reach at least zero-emission building (ZEB) requirements.

New

Zero Emission Buildings

Aligned with proposal EPBD recast

Renovation: ~~30~~ → 40% reduction of the energy demand

T1. Energy consumption and GHG emissions

TS1.1.2: Passive features

Passive ~~HVAC~~ features
↓
Passive features

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs) AND AWARD CRITERIA (ACs)	
TS1.1.2: Passive ~~HVAC~~ features	**TS1.1.2: Passive ~~HVAC~~ features**
The building design solutions ~~for heating, ventilation and air conditioning systems~~ shall incorporate the following passive features to minimise the consumption of fuel or electricity by these systems: • ~~Potential for The~~ Solar gain or solar shading via solar-control technologies and/or adjustable devices to passively increase or decrease heat and daylight gains. • The installation of solar water heating systems. • ~~The installation of heat exchangers to recover heat from drained shower water.~~ • The installation of openings and the distribution of building spaces that maximise the potential for cross or stack ventilation via temperature and/or pressure gradients and allow for secure passive night-time cooling during hot periods. • ~~Air tightness: ≤ 2m³/h.m² at 50Pa~~ • ~~Thermal bridging: ≤0.10 (y value)~~	The building design solutions ~~for heating, ventilation and air conditioning systems~~ shall incorporate the following passive features to minimise the consumption of fuel or electricity by these systems: • ~~Potential for The~~ Solar gain or solar shading via solar-control technologies and/or adjustable devices to passively increase or decrease heat and daylight gains. • The installation of solar water heating systems. • The installation of heat exchangers to recover heat from drained shower water. • The installation of Mechanical Ventilation with Heat Recovery with ≥80% efficiency. • The installation of openings and the distribution of building spaces that maximise the potential for cross-ventilation via temperature and/or pressure gradients and allow for secure passive night-time cooling during hot periods.

Removal of thresholds for constructive elements from the core criteria

Heat recovery from shower only as

Comprehensive criterion

T1. Energy consumption and GHG emissions

TS1.1.2: Passive features

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs) AND AWARD CRITERIA (ACs)	
~~• Air tightness: ≤ 2m³/h.m² at 50Pa~~ ~~• Thermal bridging: ≤0.10 (ψ value)~~ ~~The project manager~~ An independent "clerk of works" or the original design team shall ensure that the passive features are installed as per design specifications during the construction and installation stages.	• The use of construction components in walls, roof, windows and doors that comply with the thresholds of the heat transfer coefficient (U-value) by climatic zone as per the criteria defined by the Passive House Institute[1] or any other international certification with similar results. • The use of glazing that complies with the threshold of the solar heat gain coefficient (g-value) by climatic zone as per the criteria defined by the Passive House Institute[1] or any other international certification with similar results. ~~• Low thermal conductivity walls: ≤ 0.15 W/m².K.~~ ~~• Low thermal conductivity floor: ≤ 0.12 W/m².K.~~ ~~• Low thermal conductivity roof: ≤ 0.12 W/m².K.~~ ~~• Low thermal conductivity windows: ≤1.0 W/m².K.~~ ~~• Low thermal conductivity doors: ≤1.2 W/m².K.~~ • Air tightness: ≤ ~~1m³/h.m²~~ 0.6 1/h at 50Pa. ~~• Thermal bridging: ≤0.06 (ψ value)~~ ~~• Glass: ≤0.6 (g value)~~

U-values of construction elements by climatic zones

Passive House Institute

g-values of glazing by climatic zones

Passive House Institute

Air tightness (ACH)

Passive House Institute

T1. Energy consumption and GHG emissions

TS1.1.3: Energy-efficient HVAC, lighting, water heating and other building equipment

Extension to other building equipment

Benchmark of BAT in Ecodesign Regulation

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs) AND AWARD CRITERIA (ACs)	
TS1.1.3: Energy-efficient HVAC, lighting, water heating and other building equipment	**TS1.1.3: Energy-efficient HVAC, lighting, water heating and other building equipment**
Where any of the ~~HVAC, light sources or water heating~~ building equipment is covered by an EU Energy Labelling Regulation, they ~~will have an energy class that represents~~ shall be within the ~~top~~ 30% best energy performing products of the same typology.	Where any of the ~~HVAC, light sources or water heating~~ building equipment is covered by an EU Energy Labelling Regulation, they ~~will have an energy class that represents~~ shall be within the ~~top~~ 20% best energy performing products of the same typology.
~~The project manager~~ An independent "clerk of works" or the original design team shall ensure that the energy labelled equipment that is installed has suitable energy class labels during the construction and installation stages.	~~The project manager~~ An independent "clerk of works" or the original design team shall ensure that the energy labelled equipment that is installed has suitable energy class labels during the construction and installation stages.
AC1.1.3: Energy efficient HVAC, lighting, water heating and other building equipment	
A maximum of X points shall be awarded for tenders that provide design solutions where any ~~HVAC, light sources or water heating~~ building equipment covered by an EU Energy Labelling Regulation has an energy class that is the highest class available on the market at the date of submitting the tender. For those product groups which are not covered by EU Energy Labelling implementing measures, X points shall be awarded to those that meet the benchmark of best available technology set out in the corresponding Ecodesign Regulation, if available.	

~~Top classes~~

↓

% best performing products in EPREL

T1. Energy consumption and GHG emissions

TS1.1.4: Installation of BEMS and on-site or nearby renewable energy systems

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs) AND AWARD CRITERIA (ACs)	
TS1.1.4: Installation of ~~a building energy storage,~~ building energy management and on-site or nearby renewable energy systems On-site or nearby renewable energy systems shall be installed that can meet at least ~~10%~~ 50% of the estimated building energy consumption (X kWh/yr), on an annual basis. In-use commissioning should be carried out. Note that the contracting authority may choose to fix a total value of renewables, in kWh/yr, as this might be simpler than setting a % of an as yet unknown value, because each design will vary in total energy needs. ~~The building shall have an energy storage system that is capable of storing at least 2 days of normal expected energy demand.~~ A building energy management system shall also be installed to: • monitor real-time energy consumption ~~on a second by second basis~~ and make ~~this~~ these data available to building management via a live interface; • enable demand response by providing users with information to improve buildings' performance and to identify cost-cutting opportunities by detecting inefficiencies, benchmarking and planning load and energy usage; • maximise energy performance by scheduling controls, system optimisation, occupant detection control, variable speed control or other effective control functionalities. • ~~Automatically generate and log uneditable energy data files for building management.~~ • ~~Apply demand response logic in order to optimise imports from and exports to the electrical grid (e.g. export to grid during peak demand hours when electricity is more expensive and higher carbon, and import from grid during off-peak demand hours when electricity is cheaper and lower carbon).~~	

Removal of the threshold for storing capacity (also in the AC)

BEMS requirements limited to capabilities

RES threshold: ~~10~~ → 50% of building consumption

Based on national NZEB definitions in use

In-use commissioning

T1. Energy consumption and GHG emissions

CPC1.1.5: Commissioning of energy technical installations

New CONTRACT PERFORMANCE CLAUSE

CONTRACT PERFORMANCE CLAUSE (CPC)
CPC1.1.5: Commissioning of energy technical installations The building manager must provide reporting on the commissioning of energy installations (HVAC, lighting, renewable energy, etc.) on a 6-month basis at least for 1.5 years in the building use phase to ensure that energy performances are effectively met. This shall be presented in terms of use stage energy consumption by using the indicator 1.1 at level 3 of Level(s) for a common reporting format. The data from the above primary energy demand estimates should then be converted into final primary energy demand, which should be expressed by all of the indicators below unless otherwise specified by the contracting authority.

Commissioning of energy installations

Aligned with Level(s)

T1. Energy consumption and GHG emissions

AC1.2: Whole life cycle assessment

New AWARD CRITERION

Assessment of other impact categories

As per the EN 15978

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	

AC1.2: Whole life assessment

A maximum of X points shall be awarded for tenders that carry out whole life carbon assessments to report on environmental impact categories other than Global Warming Potential. They shall be estimated based on modules A through D of the building life cycle in accordance with the EN 15978 standard.

The indicators to be reported shall be as indicated in EN 15978:

Impact category	Indicator	Unit
Ozone Depletion	Depletion potential of the stratospheric ozone layer (ODP)	kg CFC 11 eq.
Acidification	Acidification potential, Accumulated Exceedance (AP)	mol H^+ eq.
Eutrophication aquatic freshwater	Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater)	kg PO4 eq.
Eutrophication aquatic marine	Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-marine)	kg N eq.
Eutrophication terrestrial	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	mol N eq.
Photochemical ozone formation	Formation potential of tropospheric ozone (POCP)	kg NMVOC eq.
Depletion of abiotic resources - minerals and metals[1,2]	Abiotic depletion potential (ADP-minerals&metals) for non-fossil resources	kg Sb eq.
Depletion of abiotic resources - fossil fuels[1]	Abiotic depletion potential (ADP-fossil) for fossil resources	MJ, net calorific value
Water use	Water (user) deprivation potential, deprivation weighted water consumption (WDP)	m^3 world eq. deprived

Q&A Theme 1

Link to Slido

Contents

Updated criteria. Theme 2

T2. Material circularity

Bill of materials
Design for deconstruction
Design for adaptability
Design for reparability and upgrading
CDE waste management

Link to SLIDO

T2. Material circularity

TS 2.1. Inventory / bill of materials of building elements, technical systems…

Estimation of replacement to help promoting circularity

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS2.1: Inventory / bill of materials of building elements, technical systems, construction products and materials purchased	**TS2.1: Inventory / bill of materials of building elements, technical systems, construction products and materials purchased**
All of the building elements, technical systems, construction products and materials purchased for the construction stage shall be inventoried for both cost and carbon.	All of the building elements, technical systems, construction products and materials purchased for the construction stage shall be inventoried for both cost and carbon.
The future replacement of building elements, technical systems, construction products and materials shall also be estimated at least for a reference study period of 25 years.	The future replacement of building elements, technical systems, construction products and materials shall also be estimated at least for a reference study period of 50 years ~~(or period defined by the contracting authority)~~.
Verification:	

Essential role promoting sustainability guiding material selection

Standard data format (EN 15978) that will help supporting sustainable decision-making for selective demolition, reparability and adaptability

Linked to T1/T5/T7

T2. Material circularity

TS 2.2. Design for deconstruction

Design stage has a key role in circularity

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS2.2-4: Design for deconstruction This indicator is relevant to new build projects ~~only~~, although in principle, it could be applied to renovation projects if the scope for scoring is reduced to only renovated elements. The building design shall be accompanied by a design for deconstruction report that promotes selective demolition and includes an inventory of the different building elements, components and materials used and how they could be disassembled or stripped and prepared for reuse, be recycled or be subject to material or energy recovery at the end of life of the building or the element, component or material. If no explanation is provided, then the building elements will be assumed to be disposal to landfill. The aim is to promote construction systems that incorporate circular economy thinking. For instance, enabling systems to be easily maintained, repaired and replaced as this will prolong the life cycle of buildings or making use of easy-to-dismount elements and products. Following the methodology defined in the Level(s) calculator based on indicator 2.4, a minimum circularity score of 40% by mass and 40% by cost shall be demonstrated. **Verification:**	**TS2.2-4: Design for deconstruction** This indicator is relevant to new build projects ~~only~~, although in principle, it could be applied to renovation projects if the scope for scoring is reduced to only renovated elements. The building design shall be accompanied by a design for deconstruction report that promotes selective demolition and includes an inventory of the different building elements, components and materials used and how they could be disassembled or stripped and prepared for reuse, be recycled or be subject to material or energy recovery at the end of life of the building or the element, component or material. The report will pay particular attention to enabling removal and safe handling of hazardous substances to facilitate reuse and high-quality recycling of materials. If no explanation is provided, then the building elements will be assumed to be disposal to landfill. The aim is to promote construction systems that incorporate circular economy thinking. For instance, enabling systems to be easily maintained, repaired and replaced as this will prolong the life cycle of buildings or making use of easy-to-dismount elements and products. Following the methodology defined in the Level(s) calculator based on indicator 2.4, a minimum circularity score of 60% by mass and 60% by cost

To identify easy-to-dismount elements

Incorporate circular economy thinking

Report promoting selective demolition

Comprehensive

Removal and safe handling of hazardous substances

Ease re-use

High Q recycling

Aligned with Level(s) indicator 2.4

European Commission

T2. Material circularity

TS 2.3. Design for adaptability

Anticipating future changes to increase durability

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS2.3. Design for adaptability ~~*Note: the potential for introducing adaptability features is much greater in new building projects than in renovation projects. The adaptability concepts are general ones only, contracting authorities should be more specific about their perceived future adaptability needs and set the requirements accordingly.*~~ The building design shall obtain an adaptability score of a minimum of X/100 points by incorporating features that: • facilitate changes to the internal space distribution • facilitate changes to the routing or type of building services (e.g. heating, ventilation and air conditioning, plumbing, electrical and telecommunications). Note that the potential for introducing adaptability features is much greater in new building projects than in renovation projects. The adaptability concepts are general ones only, contracting authorities should be more specific about their perceived future adaptability needs. **Verification:** The building design shall be scored against a pre-prepared scoring matrix, which the designer shall have been made aware of prior to the design work. The precise scoring matrix should be defined by the contracting authority and the weighting can be adjusted to reflect their priorities. An example matrix is provided in the explanatory note below. The design team shall provide a report on how the project incorporates design for adaptability (or how it repurposes an existing building) to support adaptive reuse.	**TS2.3. Design for adaptability** ~~*Note: the potential for introducing adaptability features is much greater in new building projects than in renovation projects. The adaptability concepts are general ones only, contracting authorities should be more specific about their perceived future adaptability needs.*~~ The building design shall obtain an adaptability score of a minimum of (X+10)/100 points by incorporating features that: • facilitate changes to the internal space distribution • facilitate changes to the routing or type of building services (e.g. heating, ventilation and air conditioning, plumbing, electrical and telecommunications) • facilitate changes to the building façade and structure (e.g. façade replacement, vertical or horizontal expansion of building) The design team will provide a draft that analyses future scenarios of change in the functionality of the building, making them clearly visible through concrete examples and facilitating the design for adaptability. Note that the potential for introducing adaptability features is much greater in new building projects than in renovation projects. The adaptability concepts are general ones only, contracting authorities should be more specific about their perceived future adaptability needs. **Verification:** The building design shall be scored against a pre-prepared scoring matrix, which the designer shall have been made aware of prior to the design work.

Report to support adaptative reuse

Change of location for easier understanding

Aligned with Level(s) indicator 2.3

European Commission

T2. Material circularity

AC 2.4. Design for reparability and upgrading

New AWARD CRITERION

Core criteria	Comprehensive criteria
AWARD CRITERION (ACs)	
AC2.5: Design for reparability/upgrading A maximum of X points shall be awarded for tenders that provide a reparability/upgrading report that includes a list of the priority parts of the building that are functionally important and likely to fail or to be upgraded (e.g. HVAC systems) and considerations to create favourable conditions for their repair and upgrade. **Verification:** Tenderers shall submit a reparability/upgrading report that includes the list of the priority parts and the considerations to create favourable conditions for their repair and upgrade.	

Reparability / upgrading report: list of priority parts and considerations to ease their repair

In line with the "right to repair"

European Commission

T2. Material circularity

TS 2.5. Construction, demolition and excavation waste management

~~Within a 2 km radius~~

Off site based on LCA results

~~70%~~ → 90% excluding natural material (soil and stones)

Comprehensive

Excluding backfilling

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS2.~~52~~: Construction, Demolition and Excavation Waste (CDEW) management All tenderers will provide an outline site waste management plan that identifies how CDEW generated by the building project would be segregated, stored and reused, recycled, recovered or disposed of, considering selective demolition to be a priority aspect. The plan will consider the recycling of hazardous CDEW, which can remove the hazardousness, as well as avoiding hazardous components being reinjected in the loop by reusing or upcycling them. The following targets shall be complied with by the contractor during the project: - 90% reuse on site (or ~~within a 2km radius~~ off site on condition that a LCA shows that it can potentially deliver major environmental benefits) of all non-hazardous excavation waste (soil and stones). - ~~90% diversion from landfill of all non-hazardous CDW.~~ - ~~70%~~ 90% reuse, recycling or material recovery of all non-hazardous CDEW, excluding natural material (soil and stones). In addition, the tenderer will be responsible for ensuring that all building components are adequately removed from buildings and sorted at source to guarantee that recyclable materials are diverted into a closed-loop recycling stream. **Verification:** Tenderers shall submit an outline waste management plan that illustrates what different waste streams would be generated, how they should be segregated and stored and what reuse, recycling	**TS2.~~52~~: Construction, Demolition and Excavation Waste (CDEW) management** All tenderers will provide an outline site waste management plan that identifies how CDEW generated by the building project would be segregated, stored and reused, recycled, recovered or disposed of, considering selective demolition to be a priority aspect. The plan will consider the recycling of hazardous CDEW which can remove the hazardousness, as well as avoiding hazardous components to being reinjected in the loop by reusing or upcycling them. The following targets shall be complied with by the contractor during the project: - 100% reuse on site (or off site on condition that a LCA shows that it can potentially deliver major environmental benefits) ~~within a 2km radius~~ of all non-hazardous excavation waste (soil and stones). - ~~100% diversion from landfill of all non-hazardous CDW.~~ - ~~90% reuse, recycling or material recovery of all non-hazardous CDW.~~ - ~~70~~ 90% reuse, ~~or~~ recycling or material recovery (excluding backfilling) of all non-hazardous CDEW excluding natural material (soil and stones). In addition, the tenderer will be responsible for ensuring that all building components are adequately removed from buildings and sorted at source to guarantee that recyclable materials are diverted into a closed-loop recycling stream. **Verification:**

Selective demolition to be a priority aspect

Removal of hazardous substances to promote reuse and recycle

Materials sorted at source to guarantee their delivery into a close-loop recycling stream

Appropriate planning of CEDWM (EN 15978)

Q&A Theme 2

Link to SLIDO

Contents

Updated criteria. Theme 3

T3. Efficient use of water resources

Greywater reuse systems

Link to SLIDO

European Commission

Theme 3. Efficient use of water resources

TS 3.4 Grey water reuse systems

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS3.1.4: Grey water reuse systems The building design shall include a grey water reuse system*, that captures "light grey water" (from showers, bathtubs and washbasins) following prEN 16941-2 design principles. The assessment of the inclusion of a grey water reuse system that captures grey water from showers, bathtubs, washbasins, washing machines, kitchen sinks and dishwashers in the building is to be made subject to a feasibility study.	**TS3.1.4: Grey water reuse systems** The building design shall include a grey water reuse system that captures grey water from showers, bathtubs, washbasins, washing machines, kitchen sinks and dishwashers, following prEN 16941-2 design principles. The assessment of the inclusion of a grey water reuse system that captures grey water from showers, bathtubs, washbasins, washing machines, kitchen sinks and dishwashers in the building is to be made subject to a feasibility study.

Inclusion of a greywater reuse system subject to a feasibility study

Theme 3. Efficient use of water resources

CONTRACT PERFORMANCE CLAUSE (CPC)
CPC 3.1.5: Commissioning of technical water installations The tenderer must provide reporting on the commissioning of water installations (e.g. sewerage, rainwater harvesting system) to ensure that performances are effectively met.

Verification:
Tenderers shall submit a report that includes the performance of water installation systems on a 6-month basis at least for 1.5 years in the building use phase.

New CPC

Q&A Theme 3

Link to SLIDO

Contents

Updated criteria. Theme 4

T4. Occupant comfort and wellbeing

Indoor air quality
Thermal comfort
Lighting
Acoustics
Electropollution
Accessibility

Link to Slido

T4. Occupant comfort and wellbeing

TS4.1: Indoor air quality

Same requirements for all building types

- **Hybrid** passive and mechanical ventilation
- Prioritisation of **passive** ventilation
- Thresholds for **operable** windows

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS4.1.1: Ventilation system performance	**TS4.1.1: Ventilation system performance**
~~*For residential buildings*~~	~~*For residential buildings*~~
The building shall be designed with a hybrid approach of passive window airing and mechanical ventilation, wherever possible.	The building shall be designed with a hybrid approach of passive window airing and mechanical ventilation, wherever possible.
Passive ventilation shall be prioritised in those cases in which it does not conflict with the demand for heating and cooling, e.g. in summer, at times when it is cooler outside than inside especially during the night and early morning hours.	Passive ventilation shall be prioritised in those cases in which it does not conflict with the demand for heating and cooling, e.g. in summer, at times when it is cooler outside than inside especially during the night and early morning hours.
Passive design features should be incorporated that allow for occupant adjustable openings on different sides and at different heights of the building envelope to provide cross-ventilation by natural pressure or temperature gradients.	Passive design features should be incorporated that allow for occupant adjustable openings on different sides and at different heights of the building envelope to provide cross-ventilation by natural pressure or temperature gradients.
~~*For school and office buildings:*~~	At least 75% of the regularly occupied spaces shall have operable windows that provide access to outdoor air.
~~*The building shall be designed with a hybrid approach of passive and mechanical ventilation. Passive ventilation shall provide for the baseline ventilation needs of the building while the mechanical system will be able to deliver higher ventilation rates for defined areas as and when needed.*~~	The total openable area of building apertures (windows, glass doors, sliding doors, folding doors) in each occupied cross-ventilated space shall be at least 4% of the gross internal floor area of that space or natural ventilation shall be able to provide adequate cross-ventilation rates.
~~The design should aim to maintain indoor CO2 concentrations within 800 ppm above the outdoor CO2 level. The need for additional ventilation will be triggered automatically by feedback from installed CO2 sensors.~~	The total openable area of building apertures (windows, glass doors, sliding doors, folding doors) in each occupied single-sided ventilated space shall be at least 8% of the gross internal floor area of that space.

More stringent threshold for operable windows in **single-sided** ventilated spaces

T4. Occupant comfort and wellbeing

TS4.1: Indoor air quality

Category I Indoor air quality as per EN 16798

CO_2 concentration

Ventilation rate per occupant (perceived air quality)

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
~~The design should aim to maintain indoor CO2 concentrations within 800 ppm above the outdoor CO2 level. The need for additional ventilation will be triggered automatically by feedback from installed CO2 sensors.~~	~~The design should aim to maintain indoor CO2 concentrations within 550 ppm above the outdoor CO2 level. The need for additional ventilation will be triggered automatically by feedback from installed CO2 sensors.~~
The design should aim to maintain category I indoor air quality as per EN 16798 by the following: • Maintaining indoor CO_2 concentrations within ~~800~~ 550 ppm above the outdoor CO_2 level. The need for additional ventilation will be triggered automatically by feedback from installed CO_2 sensors.	The design should aim to maintain category I indoor air quality as per EN 16798 by the following: • Maintaining indoor CO_2 concentrations within ~~550~~ 500 ppm above the outdoor CO_2 level. The need for additional ventilation will be triggered automatically by feedback from installed CO_2 sensors.
• Ensuring a minimum outdoor air rate of 10 L/s/person	• Ensuring a minimum outdoor air rate of 12.5 L/s/person.
Moreover, the ventilation system must be provided with the appropriate air filters according to the building location and external air quality as per EN 16798-3 for controlling external air pollutants.	Moreover, the ventilation system must be provided with the appropriate air filters according to the building location and external air quality as per EN 16798-3 for controlling external air pollutants.
The correct construction and installation of the ventilation system(s) and of building elements especially relevant to predicted ventilation performance shall be ensured by the project manager during the construction and installation stages.	The correct construction and installation of the ventilation system(s) and of building elements especially relevant to predicted ventilation performance shall be ensured by the project manager during the construction and installation stages.

T4. Occupant comfort and wellbeing

TS4.1: Indoor air quality

~~800~~ → 550 ppm (CO_2 concentration)

Category I as per EN 16798

10 L/s/per ventilation rate

Filters for external pollutants (PM)

As per EN 16798 - 3

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
~~The design should aim to maintain indoor CO2 concentrations within 800 ppm above the outdoor CO2 level. The need for additional ventilation will be triggered automatically by feedback from installed CO2 sensors.~~ The design should aim to maintain category I indoor air quality as per EN 16798 by the following: • Maintaining indoor CO_2 concentrations within ~~800~~ 550 ppm above the outdoor CO_2 level. The need for additional ventilation will be triggered automatically by feedback from installed CO_2 sensors.	~~The design should aim to maintain indoor CO2 concentrations within 550 ppm above the outdoor CO2 level. The need for additional ventilation will be triggered automatically by feedback from installed CO2 sensors.~~ The design should aim to maintain category I indoor air quality as per EN 16798 by the following: • Maintaining indoor CO_2 concentrations within ~~550~~ 500 ppm above the outdoor CO_2 level. The need for additional ventilation will be triggered automatically by feedback from installed CO_2 sensors.
• Ensuring a minimum outdoor air rate of 10 L/s/person	• Ensuring a minimum outdoor air rate of 12.5 L/s/person.
Moreover, the ventilation system must be provided with the appropriate air filters according to the building location and external air quality as per EN 16798-3 for controlling external air pollutants.	Moreover, the ventilation system must be provided with the appropriate air filters according to the building location and external air quality as per EN 16798-3 for controlling external air pollutants.
The correct construction and installation of the ventilation system(s) and of building elements especially relevant to predicted ventilation performance shall be ensured by the project manager during the construction and installation stages.	The correct construction and installation of the ventilation system(s) and of building elements especially relevant to predicted ventilation performance shall be ensured by the project manager during the construction and installation stages.

~~550~~ → 500 ppm (CO_2 concentration)

12.5 L/s/per ventilation rate

Filters for external pollutants (PM + G)

T4. Occupant comfort and wellbeing

AC4.1: Indoor air quality

New AWARD CRITERION

Control of other indoor pollutants

AWARD CRITERIA (AC)

AC4.1.1: Ventilation system performance

Points shall be awarded for tenders that provide design solutions that incorporate sensor monitoring and control capabilities for other indoor pollutants as follows:

Indoor pollutant	Sensor monitoring	Sensor monitoring and control
NOx	0.5 points	1 point
SOx	0.5 points	1 point
PM10	0.5 points	1 point
PM2.5	0.5 points	1 point
VOCs	0.5 points	1 point
Benzene	0.5 points	1 point
Ozone	0.5 points	1 point
Formaldehyde	0.5 points	1 point

T4. Occupant comfort and wellbeing

TS4.2: Thermal comfort

Category ~~II~~ → III of thermal environment as per EN 16798

PPD < 15%

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS4.2.1: Thermal comfort: time out of range. For occupancy patterns defined by the contracting authority, the indoor air temperatures shall be dynamically modelled for the detailed building design with hourly climate data. The building design and the Heating, Ventilation and Air Conditioning (HVAC) system shall be capable of providing at least a category III ~~II~~ thermal environment as defined in EN 16798-1 (predicted percentage of dissatisfied (PPD) < 15%), or maintain the temperature within other specific ranges defined by the contracting authority, for the building interior during at least: • 80% of occupied hours for any week, • 88% of occupied hours for any month; • 97% of occupied hours for the year. The correct construction and installation of the HVAC systems and of building elements especially relevant to predicted thermal performance shall be ensured by the project manager during the construction and installation stages.	**TS4.2.1: Thermal comfort: time out of range.** For occupancy patterns defined by the contracting authority, the indoor air temperatures shall be dynamically modelled for the detailed building design with hourly climate data for the following two situations: • With no mechanical cooling system installed. • With a mechanical cooling system installed. If no mechanical cooling system is installed, the passive features of the building design and the Heating, Ventilation and Air Conditioning (HVAC) system shall be capable of providing a category II (or category I) thermal environment as defined in EN 16798-1 (predicted percentage of dissatisfied (PPD) < 10%), or maintain the temperature within other specific ranges defined by the contracting authority, for the building interior during at least: • ~~80~~ 85% of occupied hours for any week, • ~~88~~ 92% of occupied hours for any month; • 97% of occupied hours for the year.

More stringent tolerances

Comprehensive criterion

T4. Occupant comfort and wellbeing

TS4.3: Lighting

CCT limit only for places where people work during dark hours

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS4.3.1: Electric lighting equipment requirements Interior light sources shall meet the following requirements: • Colour Rendering Index (R_a) >=80 for light sources in all areas where people work permanently. • Correlated Colour Temperature (CCT) ~~≤4000K in all areas where people work permanently during daytime or~~ ≤3000K in areas where people work permanently ~~during~~ when the sun is down/during dark hours ~~night-time~~ (this requirement may vary depending on occupant preferences, thus light sources with tunable CCT/spectra are recommended). • ~~Energy class rating of B or better.~~ • Be mercury-free. • Be dimmable. ~~via a manual control.~~	**TS4.3.1: Electric lighting equipment requirements** Interior light sources shall meet the following requirements: • Colour Rendering Index (R_a) >=80 for light sources in all areas where people work permanently. • Correlated Colour Temperature (CCT) ~~≤4000K in all areas where people work permanently during daytime or~~ ≤3000K in areas where people work permanently ~~during~~ when the sun is down/during dark hours ~~night-time~~ (this requirement may vary depending on occupant preferences, thus light sources with tunable CCT/spectra are recommended). • ~~Energy class rating of A or better.~~ • Be mercury-free. • Be dimmable. ~~via a manual and a wireless control system.~~

Energy classes already covered in T1

T4. Occupant comfort and wellbeing

TS4.4: Acoustics

New

Thresholds for speech intelligibility ISO 3382-3

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS4.4: Limits for indoor weighted average sound pressure level In addition to any acoustic performance requirements in national or regional building regulations: *For residential buildings:* The average background indoor, A-weighted continuous sound pressure level should be: • ≤30 dB($L_{Aeq,T}$) in bedrooms at night time. • ≤35 dB($L_{Aeq,T}$) in living rooms during the day. *For office or educational buildings:* The average background indoor, A-weighted continuous sound pressure level should be: • ≤40 dB($L_{Aeq,T}$) in areas for conferencing, learning or speaking (category I). • ≤45 dB($L_{Aeq,T}$) in enclosed areas for concentration (category II). • ≤50 dB($L_{Aeq,T}$) in open areas for concentration, areas with regularly used PA systems and areas for dining (category III). • ≤55 dB($L_{Aeq,T}$) in areas with machinery and appliances used by occupants (category IV)	**TS4.4: Limits for indoor weighted average sound pressure level** In addition to any acoustic performance requirements in national or regional building regulations: *For residential buildings:* The average background indoor, A-weighted continuous sound pressure level should be: • ≤30 dB($L_{Aeq,T}$) in bedrooms at night time. • ≤35 dB($L_{Aeq,T}$) in living rooms during the day. *For office or educational buildings:* The average background indoor, A-weighted continuous sound pressure level should be: • ≤35 dB($L_{Aeq,T}$) in areas for conferencing, learning or speaking (category I). • ≤40 dB($L_{Aeq,T}$) in enclosed areas for concentration (category II). • ≤45 dB($L_{Aeq,T}$) in open areas for concentration, areas with regularly used PA systems and areas for dining (category III). • ≤50 dB($L_{Aeq,T}$) in areas with machinery and appliances used by occupants (category IV)
Speech intelligibility should be: • STI range: 41–76%; • C50 range: −6.3 to 5.6 dB.	Speech intelligibility should be: • STI range: 41–76%; • C50 range: −6.3 to 5.6 dB.
Reverberation time should be: • 0.5 s for small spaces; • 0.8 s for large spaces.	Reverberation time should be: • 0.5 s for small spaces; • 0.8 s for large spaces.

New

Thresholds for reverberation time ISO 3382-3 EN 16798-1

T4. Occupant comfort and wellbeing

TS4.5: Electropollution

National and regional electromagnetic radiation requirements

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS4.5.2: In-situ assessment of wiring installation and electromagnetic fields (EMFs) The wiring installation shall be checked for correct neutral and ground connections with clamp-on ammeters ~~meters~~ and gauss meters by a qualified professional. *Sleeping areas in residential buildings:* In addition to any electromagnetic radiation requirements in national or regional building regulations, the design shall be tailored to deliver electromagnetic radiation levels in sleeping areas with the following limits: ~~The levels of electromagnetic radiation in sleeping areas shall be assessed for compliance with the following limits:~~ (i) For alternating current (AC) electric fields in sleeping areas in residential buildings (at night time): • <5.0 V/m field strength with ground potential; • <1.5 V/m field strength ground-potential-free; • <100 mV body voltage with ground potential. (ii) For AC magnetic fields in sleeping areas in residential buildings (at night time): • <100 nT or <1.0 mG flux density. (iii) For radio-frequency (RF) radiation in sleeping areas in residential buildings: • <10 μW/m² power density.	**TS4.5.2: In-situ assessment of wiring installation and electromagnetic fields (EMFs)** The wiring installation shall be checked for correct neutral and ground connections with clamp-on ammeters ~~meters~~ and gauss meters by a qualified professional. *Sleeping areas in residential buildings:* In addition to any electromagnetic radiation requirements in national or regional building regulations, the design shall be tailored to deliver electromagnetic radiation levels in sleeping areas with the following limits: ~~The levels of electromagnetic radiation in sleeping areas shall be assessed for compliance with the following limits:~~ (i) For alternating current (AC) electric fields in sleeping areas in residential buildings (at night time): • <2.0 V/m field strength with ground potential; • <0.6 V/m field strength ground-potential-free; • <20 mV body voltage with ground potential. (ii) For AC magnetic fields in sleeping areas in residential buildings (at night time): • <40 nT or <0.4 mG flux density. (iii) For radio-frequency (RF) radiation in sleeping areas in residential buildings: • <0.2 μW/m² power density.

T4. Occupant comfort and wellbeing

TS4.6: Accessibility

In line with EN 17210 & European Accessibility Act

New TECHNICAL SPECIFICATION

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS4.6: Physical access to the building and its services In order to maximise the foreseeable use of the built environment in an independent manner by persons with disabilities, the accessibility of areas intended for public access shall include the following aspects: (a) use of related outdoor areas and facilities; (b) approaches to buildings; (c) use of entrances; (d) use of paths in horizontal circulation; (e) use of paths in vertical circulation; (f) use of rooms by the public; (g) use of equipment and facilities used in the provision of the service; (h) use of toilets and sanitary facilities; (i) use of exits, evacuation routes and concepts for emergency planning; (j) communication and orientation via more than one sensory channel; (k) use of facilities and buildings for their foreseeable purpose; (l) protection from hazards in the environment indoors and outdoors. The general accessibility features installed shall comply with any relevant technical criteria set out in EN 17210 as well as requirements and recommendations in EN 17210 that are specific for the building type in question.	

Q&A Theme 4

Link to Slido

Contents

Updated criteria. Theme 5

T5. Vulnerability and resilience to Climate Change

Climate vulnerability risk assessment
Future thermal comfort: time out of range
Passive features to minimise overheating risk
Design for resilience to drought
Design for resilience to storm/heavy precipitations
Design for resilience to flooding
Sustainable drainage

Link to SLIDO

T5. Vulnerability and resilience to CC

TS 5.1 Climate vulnerability risk assessment (I)

New approach

CVRA results lead to different ambition level

Trade-offs with other hazards should be balance

Pull of measures is provided to find the appropriate solution

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS5.1: Climate vulnerability risk assessment (CVRA) A holistic and multi-disciplinary climate vulnerability and risk assessment shall be provided prior to the design of technical adaptation solutions for the building. **Verification:** The design team shall provide, as a minimum, a	**TS5.1: Climate vulnerability risk assessment (CVRA)** A holistic and multi-disciplinary climate vulnerability and risk assessment shall be provided prior to the design of technical adaptation solutions for the building. In addition, CVRA shall be carried out at regular intervals within the lifespan of the building, given the uncertainty of climate projections and the potential for unforeseen impact development.

Comprehensive

CVRA at regular intervals to consider uncertainty of climate projections and unforeseen impacts

IPCC AR6 states that 'information on climate risks needs to be embedded into the architectural design"

Linked to T6

European Commission

T5. Vulnerability and resilience to CC

TS 5.1 Climate vulnerability risk assessment (II)

As a minimum, a building-specific CVRA: assessment of exposure+ vulnerability+ potential impact

Verification:

The design team shall provide, as a minimum, a building-specific CVRA that consists of:

- an assessment of exposure, covering the physical hazards that a building is likely to be exposed to within its expected life span, along with any environmental factors that may have an influence;
- an assessment of the vulnerability of a building to the identified hazards, comprising an analysis of sensitivity/susceptibility and adaptive capacity; and
- an overview of the potential impacts, along with an assessment of the likelihood and magnitude of these in order to assess climate-related risks to the building.

The methodology followed shall be described in detail and the definitions, assumptions and data sources shall be clearly stated.

The final results are encouraged to be reported in the format presented in the explanatory note for the sake of transparency and consistency.

[EU-level technical guidance on adapting buildings to climate change]

potential for unforeseen impact development.

Verification:

The design team shall provide phased CVRAs that consist of a vulnerability analysis (Phase 1), and a risk assessment (Phase 2). They shall be presented at the regular intervals defined by the contracting authority. The report shall be based on the reporting format provided in the explanatory note.

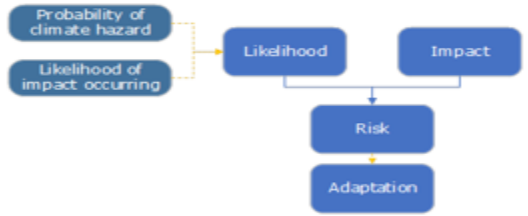
The vulnerability analysis should be assessed based on the combination of exposure and sensitivity of the building to hazards. The exposure analysis is carried out as the first step, and sensitivity is then assessed for the hazards that are found to be relevant.

Phase 1

For the risk assessment, a further analysis of the likelihood and impacts should be carried out for each of the significant hazards identified.

Risks found to be above an acceptable level should then be reduced where possible through the appropriate adaptation measures.

Phase 2



The criteria to assign the rating of exposure, sensitivity, likelihood and impact shall be described in detail and the definitions, assumptions and data sources shall be clearly stated.

The final results should be reported in the format presented in the explanatory note for the sake of transparency and consistency.

New approach

Comprehensive

Phased CVRA:
1.Vulnerability: exposure + sensibility
2. Risk: likelihood + impacts

T5. Vulnerability and resilience to CC

TS 5.2.1 Resilience to heat waves. Future thermal comfort

Design stage has a key role in resilience

Same process described in TS 4.2.1 but using projected future climate data

Category ~~II~~ → III of thermal environment

PPD < 15%

More stringent tolerances

Comprehensive

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS5.2.1: Future thermal comfort: time out of range For occupancy patterns defined by the contracting authority, the indoor air temperatures shall be dynamically modelled for the detailed building design with hourly climate data projected to 2030 for the following two situations: • With no mechanical cooling system installed. • With a mechanical cooling system installed. If no mechanical cooling system is installed, the passive features of the building design and any installed HVAC equipment shall be capable of providing at least a category III thermal environment as defined in EN 16798-1 (predicted percentage of dissatisfied (PPD) < 15%) for the building interior during at least ~~an indoor temperature within the range of 18 to 27 °C for occupied spaces for:~~ • 80% of occupied hours for any week; • 88% of occupied hours for any month; • 95% of occupied hours for the year. If a mechanical cooling system is installed, it should be sized to guarantee at least a category III thermal environment ~~an upper temperature of less than 27°C~~ during 95% of the occupied hours for any week. The correct construction and installation of the HVAC systems and of any building elements especially relevant to predicted thermal performance shall be ensured by the project manager during the construction and installation stages. **Verification:**	**TS5.2.1: Future thermal comfort: time out of range** For occupancy patterns defined by the contracting authority, the indoor air temperatures shall be dynamically modelled for the detailed building design with hourly climate data projected to 2050 for the following two situations: • With no mechanical cooling system installed. • With a mechanical cooling system installed. If no mechanical cooling system is installed, the passive features of the building design and any heating system shall be capable of providing at least a category II ~~(or category I)~~ thermal environment as defined in EN 16798-1 (predicted percentage of dissatisfied (PPD) < 10%), or maintain the temperature within specific ranges defined by the contracting authority, for the building interior during at least: • 85% of occupied hours for any week; • 92% of occupied hours for any month; • 97% of occupied hours for the year. If a mechanical cooling system is installed, it should be sized to guarantee at least a category II thermal environment during 97% of the occupied hours for any week. The correct construction and installation of the HVAC systems and of any building elements especially relevant to predicted thermal performance shall be ensured by the project manager during the construction and installation stages.

T5. Vulnerability and resilience to CC

TS 5.2.2 Resilience to heat waves. Passive features to minimize overheating risk

High CVRA results lead to incorporate passive features

Medium

Comprehensive

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS5.2.2: Passive features to minimise overheating risk	**TS5.2.2: Passive features to minimise overheating risk**
In cases where the CVRA identifies a 'High' overheating risk, ~~Regardless of whether a mechanical cooling system is installed or not~~, the building design will incorporate passive features to help regulate internal temperature, such as: • Adjustable solar shading or solar control technologies to maximise solar gain in cold periods and minimise solar gain in hot periods. • Cross-ventilation to allow excessively hot air to rise through and exit the building. • The use of exposed thermal mass or phase change materials to buffer against overheating.	In cases where the CVRA identifies a 'Medium' overheating risk, ~~Regardless of whether a mechanical cooling system is installed or not~~, the building design will incorporate passive features to help regulate internal temperature, such as: • Adjustable solar shading or solar control technologies to maximise solar gain in cold periods and minimise solar gain in hot periods. • Cross-ventilation to allow excessively hot air to rise through and exit the building. • The use of exposed thermal mass or phase change materials to buffer against overheating. • The use of heat exchangers to dump excess heat from air into the water heating system. • The use of an overhanging green roof, green balconies and/or green facades to provide thermal mass, solar shading and evaporative cooling effects via evapotranspiration (see TS 7.1 and 7.2.).
Other passive solutions may be considered, such as those presented in the explanatory note, balancing trade-offs with other hazards and taking into account other key considerations based on the location, climate, building typology, etc.	Other passive solutions may be considered, such as those presented in the explanatory note, balancing trade-offs with other hazards and taking into account other key considerations based on the location, climate, building typology, etc.
The correct construction and installation of any building elements especially relevant to predicted thermal performance shall be ensured by the project manager during the construction and installation stages. **Verification:** The design team shall provide a brief description of the building design with the passive thermal aspects clearly highlighted. The project manager shall provide written confirmation that the relevant design features have been appropriately installed.	The correct construction and installation of any building elements especially relevant to predicted thermal performance shall be ensured by the project manager during the construction and installation stages.

Other passive solutions may be considered, balancing trade-offs

Adaptation measure	Element	Impact on other hazards	Key considerations
Orientation of main facades away from direct sunlight to minimise solar gains	Building shape	N/A	+ Reduced energy demand and costs ! Potential trade-offs with natural lighting and desired heat gains during winter Not suitable for a retrofit or renovation
Insulation of walls, windows and roofs	Walls, windows, roof	! Flooding ! Heavy precipitation	+ Reduced energy demand and costs ! Possibility of humidity occurring within the walls and roof
Solar control features	Windows	! Storms in case of exterior shading device	! During instances of high winds, long protrusions are fragile elements of a building
Light-coloured and reflective materials	Walls, roof	N/A	+ Reduced energy demand and costs ! Risk of glaring effects to the surroundings and the visual comfort of people
Photovoltaic (PV) installations on roof	Roof	! Storms	+ Provision of clean energy source + Acts as a shading device + Can be coupled with green roofs ! Should be impact-resistant in storm and hail-prone regions
Green roof	Roof, vegetation	+ Heavy precipitation	! Higher embodied carbon due to additional load for roof structure +Benefits for biodiversity + Improved the efficiency of PV installations
Green facades	Vegetation, walls	+ Heavy precipitation	+ Benefits for biodiversity + Reduced energy demand and costs ! Humidity of wall structure can be harmful for thermal function of the wall Potential for mould growth.
High vegetation on sun-exposed sides of the building to provide shading (exterior)	Vegetation	+ Heavy precipitation + Flooding ! Storms ! Subsidence	+ Benefits for biodiversity + Reduced energy demand and costs ! Risk of vegetation being uprooted during storms !If roots are too close they expose foundations to higher risk of subsidence
Passive ventilation through thermal chimneys	Space considerations	N/A	+ Reduces energy demand for cooling and ventilation Not suitable for a retrofit or renovation

European Commission

T5. Vulnerability and resilience to CC

TS 5.2.2 Resilience to heat waves. Passive features to minimize overheating risk

Other passive solutions may be considered, balancing trade-offs

Adaptation measure	Element	Impact on other hazards	Key considerations
Orientation of main facades away from direct sunlight to minimise solar gains	Building shape	N/A	+ Reduced energy demand and costs ! Potential trade-offs with natural lighting and desired heat gains during winter Not suitable for a retrofit or renovation
Insulation of walls, windows and roofs	Walls, windows, roof	! Flooding ! Heavy precipitation	+ Reduced energy demand and costs ! Possibility of humidity occurring within the walls and roof
Solar control features	Windows	! Storms in case of exterior shading device	! During instances of high winds, long protrusions are fragile elements of a building
Light-coloured and reflective materials	Walls, roof	N/A	+ Reduced energy demand and costs ! Risk of glaring effects to the surroundings and the visual comfort of people
Photovoltaic (PV) installations on roof	Roof	! Storms	+ Provision of clean energy source + Acts as a shading device + Can be coupled with green roofs ! Should be impact-resistant in storm and hail-prone regions
Green roof	Roof, vegetation	+ Heavy precipitation	! Higher embodied carbon due to additional load for roof structure +Benefits for biodiversity + Improved the efficiency of PV installations
Green facades	Vegetation, walls	+ Heavy precipitation	+ Benefits for biodiversity + Reduced energy demand and costs ! Humidity of wall structure can be harmful for thermal function of the wall Potential for mould growth.

European Commission

T5. Vulnerability and resilience to CC

TS 5.3 Design for resilience to drought

New TS

High CVRA results lead to reduce potential drought damage

Medium

Comprehensive

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS5.3: Design for resilience to drought	**TS5.3: Design for resilience to drought**
In cases where the CVRA identifies a 'High' drought risk, in order to reduce the potential damage, solutions presented in the explanatory note may be considered, balancing trade-offs with other hazards and taking into account other key considerations based on the location, climate, building typology, etc. The correct construction and installation of any building elements especially relevant to drought resilience shall be ensured by the project manager during the construction and installation stages.	In cases where the CVRA identifies a 'Medium' drought risk, in order to reduce the potential damage, solutions presented in the explanatory note may be considered, balancing trade-offs with other hazards and taking into account other key considerations based on the location, climate, building typology, etc. The correct construction and installation of any building elements especially relevant to drought resilience shall be ensured by the project manager during the construction and installation stages.
Verification: The design team shall provide a brief description of the building design with the drought resilience aspects clearly highlighted. The project manager shall provide written confirmation that the relevant design features have been appropriately installed.	**Verification**: The design team shall provide a brief description of the building design with flood resilience aspects clearly highlighted. The project manager shall provide written confirmation that the relevant design features have been appropriately installed.

Proposed solutions as a guideline considering trade-offs

Solution	Element	Impact on other hazards	Key considerations
Air-handling unit (AHU), condensate, capture and reuse	Services	• Heat waves	N/A
Designating water-stressed areas	Space consideration	• Heat waves • Subsidence	N/A
Recycling grey water	Services	N/A	Recycled water should be reused on site where possible.
Indoor water efficiency installation (Water-efficient fixtures and fittings)	Services	• Heat waves	! Requires regular checking and monitoring for leakages
On-site water source, such as on-site water storage or wells that can supply water for 3 to 4 days	Services	• Heat waves • Storms	Consider the storage location to ensure it is protected from sunlight
Rainwater harvesting	Roof	• Heat waves	Consider the storage location to ensure it is protected from sunlight
Nature-based solutions (NBS)	Vegetation	• Heat waves	Select drought-tolerant species

Linked to T3/T7

T5. Vulnerability and resilience to CC

TS 5.4 Design for resilience to storms and heavy precipitations

New TS

High CVRA results lead to reduce potential damage

Medium

Comprehensive

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS5.4: Design for resilience to storm/heavy precipitation	**TS5.4: Design for resilience to storm/heavy precipitation**
In cases where the CVRA identifies a 'High' storm/heavy precipitation risk, in order to reduce the potential damage, solutions presented in the explanatory note may be considered, balancing trade-offs with other hazards and taking into account other key considerations based on the location, climate, building typology, etc. The correct construction and installation of any building elements especially relevant to storm/heavy precipitation resilience shall be ensured by the project manager during the construction and installation stages.	In cases where the CVRA identifies a 'Medium' storm/heavy precipitation risk, in order to reduce the potential damage, solutions presented in the explanatory note may be considered, balancing trade-offs with other hazards and taking into account other key considerations based on the location, climate, building typology, etc. The correct construction and installation of any building elements especially relevant to storm/heavy precipitation resilience shall be ensured by the project manager during the construction and installation stages.
Verification: The design team shall provide a brief description of the building design with the storm/heavy precipitation resilience aspects clearly highlighted. The project manager shall provide written confirmation that the relevant design features have been appropriately installed.	**Verification:** The design team shall provide a brief description of the building design with storm/heavy precipitation resilience aspects clearly highlighted. The project manager shall provide written confirmation that the relevant design features have been appropriately installed.

Proposed solutions as a guideline considering trade-offs

Solution	Element	Impact on other hazards	Key considerations
Favour aerodynamic shapes	Building shape	N/A	! Without creating wind tunnels ! For high-rises, the impact on birds should be assessed
Lowest liveable floor elevated above ground level	Foundations	+ Flooding	! Negative impact on wind loads
Undertake performance-based wind design	Primary structure	N/A	N/A
Limit peak story drift	Primary structure	N/A	N/A
Effective roof drainage system	Roof	+ Heat waves + Heavy precipitation + Flooding	N/A
Changing the size and increasing the frequency of fastenings for roof tiles, slates and ridges	Roof	N/A	N/A

...

Linked to T7

T5. Vulnerability and resilience to CC

TS 5.5 Design for resilience to flooding

High CVRA results lead to reduce potential damage

Medium

Comprehensive

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS5.5.1: Design for resilience to flooding	**TS5.5.1: Design for resilience to flooding**
In cases where the CVRA identifies a 'High' flooding risk, in order to reduce the potential damage ~~caused by flooding~~:	In cases where the CVRA identifies a 'Medium' flooding risk, in order to reduce the potential damage ~~caused by flooding~~:
• the lowest points of ingress to the building shall be elevated to a level equivalent to that of a 1 in 100 year (1% probability) flood event; or • the building envelope shall be treated to be impermeable to water to a level equivalent to that of a 1 in 100 year (1% probability) flood event plus 1 metre.	• the lowest points of ingress to the building shall be elevated to a level equivalent to that of a 1 in 200 year (0.5% probability) flood event; • the building envelope shall be treated to be impermeable to water to a level equivalent to that of a 1 in 200 year (0.5% probability) flood event plus 1 metre; • the interior surfaces of the ground floor and any subterranean floors will be designed and treated to be resilient to exposure to flood water (e.g. no critical equipment located in these levels, materials are impermeable and/or easy to dry and clean and not be subject to warping or corrosion after flooding).
Other solutions may be considered, such as those presented in the explanatory note, balancing trade-offs with other hazards and taking into account other key considerations based on the location, climate, building typology, etc.	Other solutions may be considered, such as those presented in the explanatory note, balancing trade-offs with other hazards and taking into account other key considerations based on the location, climate, building typology, etc.
The correct construction and installation of any building elements especially relevant to flood resilience shall be ensured by the project manager during the construction and installation stages. **Verification:** The design team shall provide a brief description of the building design with the flood resilience aspects clearly highlighted.	

Proposed solutions as a guideline considering trade-offs

Solution	Element	Impact on other hazards	Key considerations
Square shape	Building shape	! Storms ! Heavy precipitation	! Long walls should not face the direction of flow Not suitable for a retrofit or renovation
Buoyant foundation in amphibious buildings	Foundations	N/A	Not suitable for a retrofit or renovation
Elevated structure	Foundations	+ Subsidence	Not suitable for a retrofit or renovation
Preliminary soil study	Foundations	+ Heavy precipitation	N/A
Wet flood proofing (vents, internal drainage system, etc.)	Foundations	+ Storms + Heavy precipitation	+ Cheaper than dry proofing ! Extensive cleanup required after flood, risk to health
Water-resistant materials (plaster-based coating or water-repellent mortar)	Walls & Preferred materials	+ Storms + Heavy precipitation	! Possible decrease in breathability
Permanent flood barrier (automatic barriers, flood walls, retractable barriers)	Windows & doors	+ Drought + Storms + Flooding	N/A
Temporary flood barriers (flood shields, sand bags, deployable and inflatable barriers)	Windows & doors	+ Drought + Storms + Flooding	N/A

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European Commission

T5. Vulnerability and resilience to CC

TS 5.5 Design for resilience to flooding

New award criterion

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
AWARD CRITERIA (AC)	
TS5.5.2: Water retention system In order to reduce the potential damage caused by flooding in regions with heavy precipitation and pluvial risks, a water retention system should be installed to support the water storage in and around buildings. The correct construction and installation of any building elements especially relevant to flood resilience shall be ensured by the project manager during the construction and installation stages. **Verification:** The design team shall provide a maintenance plan and a detailed description of the water retention system, including all of its components, how they are linked, any storage capacities, overflow pipes and controlled runoff outlets. A report of the hydraulic simulation showing how the water retention system performs under the design storm conditions shall be provided. Any assumptions shall be clearly explained. The project manager shall provide written confirmation that the relevant design features have been appropriately installed.	

To reduce potential damage in regions with heavy precipitations and pluvial risk

Maintenance plan and report of hydraulic simulation of performance under storm conditions

T5. Vulnerability and resilience to CC

TS 5.6 Sustainable drainage

High CVRA results lead to reduce potential damage

Medium

Comprehensive

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
TS5.6. Sustainable drainage	**TS5.6. Sustainable drainage**
In cases where the CVRA identifies a 'High' flooding risk, or for a design storm of 1 in 100 year return period (1% probability) of 4 hour duration, the drainage system for the building and any surrounding plot area will be designed to hold rainwater on site and deliver runoff rates that are the same or lower than if the plot was an undeveloped greenfield site.	In cases where the CVRA identifies a 'Medium' flooding risk, or for a design storm of 1 in 200 year return period (0.5% probability) of 8 hour duration, the drainage system for the building and any surrounding plot area will be designed to hold rainwater on site and deliver runoff rates that are the same or lower than if the plot was an undeveloped greenfield site.
The drainage system may be linked only to the building or be part of a larger system that also drains other areas beyond the building plot area. In either case, the design performance should be validated for the whole drainage system.	The drainage system may be linked only to the building or be part of a larger system that also drains other areas beyond the building plot area. In either case, the design performance should be validated for the whole drainage system.
Other solutions may be considered, such as those presented in the explanatory note, balancing trade-offs with other hazards and taking into account other key considerations based on the location, climate, building typology, etc.	Other solutions may be considered, such as those presented in the explanatory note, balancing trade-offs with other hazards and taking into account other key considerations based on the location, climate, building typology, etc.

Proposed solutions as a guideline considering trade-offs

Solution	Element	Impact on other	Key considerations
Truncating downspouts	Roof	+ Flooding + Drought	! Not a standalone solution
Blue roof	Roof & vegetation	+ Heat waves + Drought + Flooding	+ Reduces energy demand
Blue-green roof	Roof & vegetation	+ Heat waves + Drought + Flooding	+ Benefits for biodiversity + Reduces energy demand
Green roof (extensive or intensive)	Roof & vegetation	+ Drought + Heat waves + Storms	+ Benefits for biodiversity
Permeable or pervious soils	Vegetation & space considerations	+ Flooding + Storms + Heat waves	N/A
Rain gardens and swales	Vegetation & space consideration	+ Drought + Heat waves + Storms	+ Benefits for biodiversity + Can be combined with rainwater
Ground preparation	Structure	+ Flooding + Storms + Drought	+ Improves drainage + Mitigates landslide risk Retrofitting could be

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Linked to T3/T7

European Commission

Q&A Theme 5

Link to SLIDO

Contents

Updated criteria. Theme 6

T6. Life Cycle Costing

Life cycle cost assessment

No major changes

European Commission

Contents

1. Housekeeping rules and general points
2. Purpose of this meeting
3. Introduction to GPP criteria for buildings
4. Selection criteria
5. **Criteria by Themes**
6. Final considerations

T1. Energy consumption and GHG emissions

T2. Material circularity

T3. Efficient use of water resources

T4. Occupant comfort and wellbeing

T5. Vulnerability and resilience to climate change

T.6 Life cycle costing

T.7 Biodiversity

Updated criteria. Theme 7

T7. Biodiversity

Landscaping and habitat creation
Roof and façade greening systems*
Artificial light at night
Certification for wood products

Link to SLIDO

European Commission

T7. Vulnerability and resilience to CC

TS 7.2 Landscaping and habitat creation

Less prescriptive approach

Biodiversity assessment

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
Note: TS7.4 should be considered especially for schools and any buildings with a significant plot area. Contracting authorities should look for synergies here in combination with TS7.1, TS7.3, especially TS5.3 and possibly TS3.1.2 and TS3.1.3.	
TS7.2 4: Landscaping and habitat creation	**TS7.2 4: Landscaping and habitat creation**
~~From a satellite view, at least 60% of the building plot area, including space occupied by the building, shall be landscaped with vegetation and/or water surfaces.~~ ~~In areas that are already covered by the building or by road or walkway access routes for occupants and visitors, this area could potentially be counted as vegetated if a green roof and/or green wall is installed above.~~	~~From a satellite view, at least 80% of the building plot area, including space occupied by the building, shall be landscaped with vegetation and/or water surfaces.~~ ~~In areas that are already covered by the building or by road or walkway access routes for occupants and visitors, this area could potentially be counted as vegetated if a green roof and/or green wall is installed above.~~
The contracting authority provides tenderers with a preliminary assessment of the biodiversity in the surrounding environment, so that they can tailor the design and any modelling taking into consideration the pre-existing ecological conditions (e.g. native plants).	The contracting authority provides tenderers with a preliminary assessment of the biodiversity in the surrounding environment, so that they can tailor the design and any modelling taking into consideration the pre-existing ecological conditions (e.g. native plants).
All excess rainwater drainage shall be routed through the vegetated plot area before leaving site. This may be achieved using nature-based drainage systems. ~~including:~~ • ~~Grassed swales.~~ • ~~Infiltration basins.~~ • ~~Retention ponds and artificial wetlands (including reed beds).~~	All excess rainwater drainage and grey water shall be routed through the vegetated plot area before leaving site. This may be achieved using nature-based drainage systems, including: • grassed swales; • infiltration basins; • retention ponds and artificial wetlands (including reed beds); • fountains or similar water features that provide drinking water for birds.
No use of pesticides or herbicides shall be permitted. The correct construction and installation of any landscaping and drainage components especially relevant to design performance shall be ensured by the project manager during the site preparation, construction and installation stages. The building management shall take responsibility for maintenance of the landscaped areas directly or via sub-contracted to specialised operators. **Verification:**	A preliminary filtering of grey water via limestone and clay reed beds is recommended before it joins any rainwater irrigation and drainage flows. No use of pesticides or herbicides shall be permitted. *For educational buildings* Plants shall be used to create shadows and/or provide shade over paving areas (including playgrounds) on the site within 10 years of planting.

Importance of outdoor areas protected from the sun

European Commission

T7. Vulnerability and resilience to CC

TS 7.3 Roof and façade greening systems

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
Note: TS7.3.2 These criteria are generally applicable to new construction only, unless renovation plans are able to ensure that the building structure can handle the extra load ~~(static and dynamic)~~ of a green roof. In major renovation, it is possible that an intensive green roof could also be supported by new columns as part of a structural "exoskeleton".	
TS7.3 2: Green roofs The roof area of the building and any above-ground parking bays shall be covered by a~~n extensive~~ green roof or roofs, planted or seeded with low maintenance sedums, grasses, ~~mosses~~ and wildflower species that are known to support certain bird and invertebrate species. The vegetation used for the green roof shall be locally appropriate native species. A system for occasional irrigation (extensive green roofs) or for regular irrigation (intensive green roofs), as and when needed, shall be included in the design. The correct design ~~construction~~ and installation of any green roof system components is especially relevant to design performance and shall be ensured by the project ~~manager~~ designer and installer during the ~~construction~~ design and installation phase ~~stages~~. **Verification:** The contracted design team shall provide a design report on routine maintenance inspection and other maintenance-related issues of the green roof that could include the following aspects: • replacement planting/reseeding; • ~~inspection~~ of drainage outlets and non-vegetated areas. The maintenance interval of the green roof shall be tailored taking into consideration how the roof is used and the plant communities installed but should happen no less than once a year. The maintenance interval shall also be specified in the case of presence of an irrigation system.	**TS.3 2:: Green roofs** The roof area of the building and any above-ground parking bays shall be covered by a~~n intensive~~ green roof or roofs, seeded or planted with a variety of suitable plants such as grasses, ~~mosses~~, wildflower species, bushes and trees that are known to support certain bird and invertebrate species. The vegetation used for the green roof shall be locally appropriate native species. A system for occasional irrigation (extensive green roofs) or for regular irrigation (intensive green roofs), as and when needed, shall be included in the design. The green roof(s) shall be designed to be accessible to building occupants and to provide an amenity area(s). The correct design ~~construction~~ and installation of any green roof system components especially relevant to design performance shall be ensured by the project ~~manager~~ designer and installer during the design and installation ~~phase~~ stages. **Verification:** The contracted design team shall provide a design report on routine maintenance inspection and other maintenance-related issues of the green roof that could include the following aspects: • replacement planting/reseeding; • ~~inspection~~ of drainage outlets and non-vegetated areas. The maintenance interval of the green roof shall be tailored taking into consideration how the roof is used and the plant communities installed but should happen no less than once a year. The maintenance interval shall also be specified in the case of presence of an irrigation system.

Native species

Relevance of maintenance plans

European Commission

T7. Vulnerability and resilience to CC

TS 7.3 Roof and façade greening systems

Same basis as for Green roofs

TS7.3 ~~2~~: Green walls

The exterior façade of the building shall be covered by ~~planted or seeded with low maintenance sedums, grasses, mosses and~~ wildflower species that are known to support certain bird species.

The vegetation used for the green wall shall be locally appropriate native species.

The correct design ~~construction~~ and installation of any green wall components is especially relevant to design performance and shall be ensured by the project ~~manager~~ designer and installer during the ~~construction~~ design and installation phase ~~stages~~.

Verification:

The contracted design team shall provide a design report illustrating the specifications for:

- surface characteristics (e.g. waterproofing of the building wall, type of material);
- load-bearing characteristics;
- support structures (e.g. cables, mesh or trellises) depending on the growth patterns of the plants and whether or not they have adhesive organs;
- moisture retention, other properties and dimensions of the green wall system;
- the irrigation, when needed and depending on the type of green wall;
- drainage components (e.g. drainage layer);
- the type of vegetation to be included and any installation and maintenance instructions.

The contractor shall install the green wall(s) as be provided instructions and this shall be checked and verified in writing by the project manager.

Regular maintenance of a green wall is necessary after installation according to the vegetation type and shall not be less than once a year.

T7. Vulnerability and resilience to CC

TS 7.5 Chain of custody for wood products in buildings

Aligned with the EU ecolabel criteria on wood

Core criteria	Comprehensive criteria
TECHNICAL SPECIFICATIONS (TSs)	
	TS7.5: Certification for wood products All virgin wood, cork and bamboo used in the building shall be covered by valid sustainable forest management certificates issued by an independent third-party certification scheme such as FSC, PEFC or equivalent. Where a certification scheme allows the mixing of uncertified material with certified and/or recycled materials in a product or production line, a minimum of 70% of the wood, cork and/or bamboo shall be sustainable certified virgin materials and/or recycled material. Uncertified material shall be covered by a verification system which ensures that it is legally sourced and meets any other requirement of the certification scheme with respect to uncertified material. The certification bodies issuing forest and/or chain of custody certificates shall be accredited or recognised by that certification scheme.

New TECHNICAL SPECIFICATION

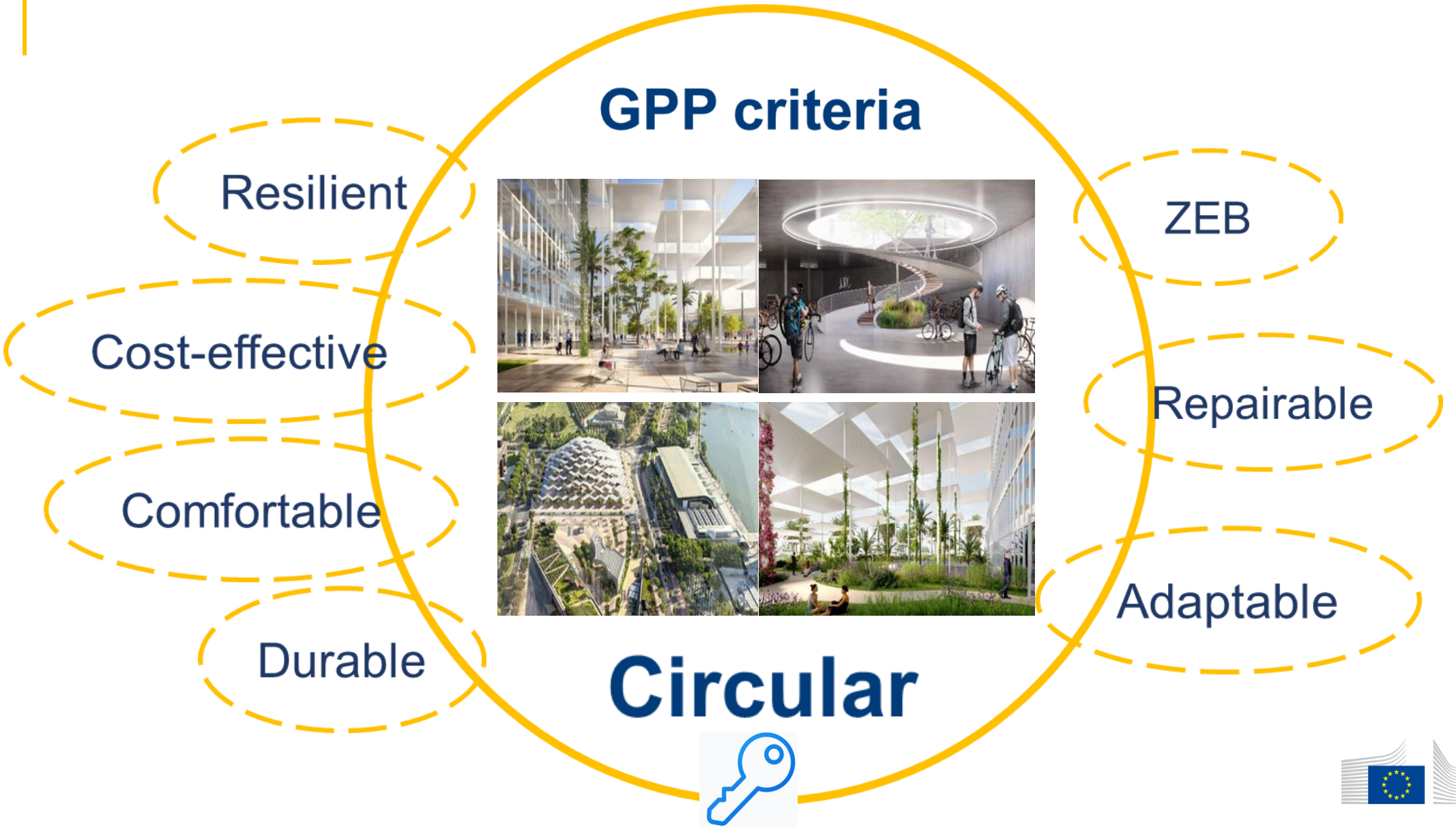
Linked to T7.2

Q&A Theme 7

Link to SLIDO

Contents

GOAL: circular buildings



European Commission

Final Q&A

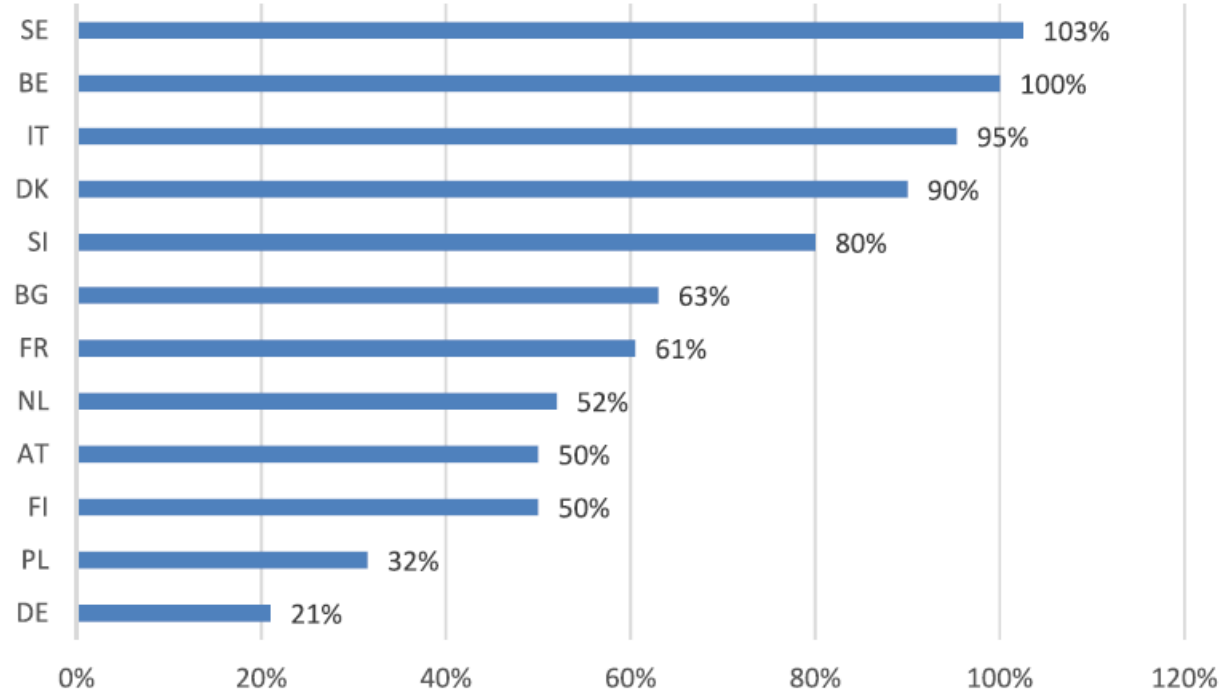
European Commission

We appreciate your interest

European Commission

T1. Energy consumption and GHG emissions

TS1.1.4: Installation of BEMS and on-site or nearby renewable energy systems



Average RES share in best practice NZEBs buildings by MS.

D'Agostino D, Tsemekidi Tzeiranaki S, Zangheri P, Bertoldi P Assessing Nearly Zero Energy Buildings (NZEBs) development in Europe. Energy Strategy Reviews 36 (2021) 100680

European Commission

T2. Material circularity

TS 2.2 Design for deconstruction

Level(s) indicator 2.4 design for deconstruction calculator

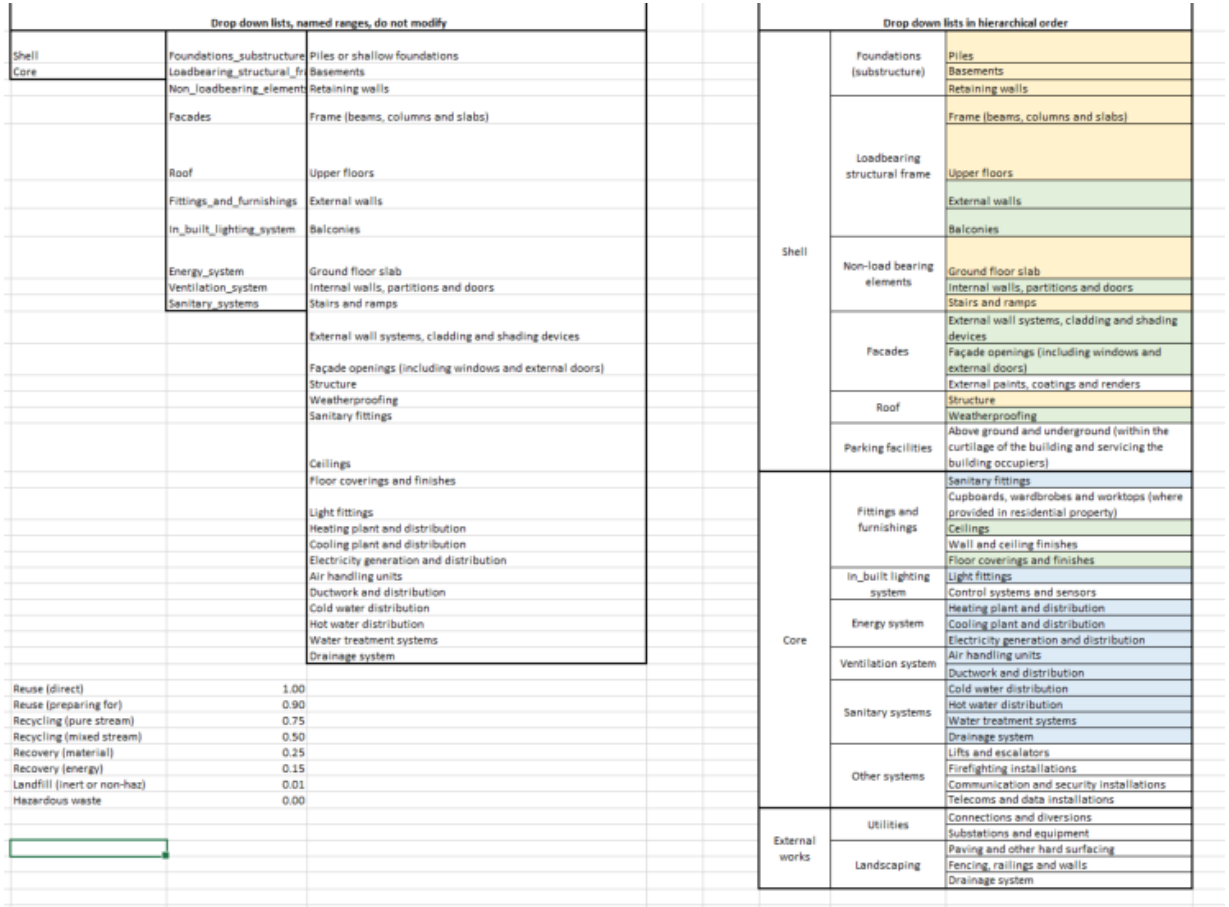
Tier 1 building element	Tier 2 building element	Tier 3 building element	Further explanation of entry (optional)	Quantity (kg)	Value (EUR)	Circularity (best practical outcome)	Circularity coefficient	Circularity score (by mass)	Circularity score (by value)	Overall circularity score (by mass)	Overall circularity score (by value)
Shell	Facades	External wall systems, cladding and shading devices	Bricks with mortar	100000	50000	Recycling (mixed stream)	0.50	50000	25000	#N/A	#N/A
Shell	Facades	External wall systems, cladding and shading devices	Natural stone tile cladding fixed by grout and adhesive	12500	20000	Recycling (pure stream)	0.75	9375	15000		
Shell	Facades	External wall systems, cladding and shading devices	Metal frame that is mechanically fastened to structure and creates an overhanging roof for	8000	24000	Reuse	#N/A	#N/A	#N/A		
Shell	Non_loadbearing_elements	Internal walls, partitions and doors	Wood-based panels bound by formaldehyde resin	250	2000	Recovery (energy)	0.15	37.5	300		
Shell	Non_loadbearing_elements	Internal walls, partitions and doors	Clay masonry units rendered with plaster	750	3000	Landfill (inert or non-haz)	0.01	7.5	30		
Core	In_built_lighting_system	Light fittings	Plastic frames to support the bulbs that have a metallic surface coating	200	1500	Recovery (energy)	0.15	30	225		

Level(s) calculator. Indicator 2.4

European Commission

T2. Material circularity

TS 2.2 Design for deconstruction



Drop down lists, named ranges, do not modify

Shell	Foundations_substructure	Piles or shallow foundations
Core	Loadbearing_structural_fr	Basements
	Non_loadbearing_element	Retaining walls
	Facades	Frame (beams, columns and slabs)
	Roof	Upper floors
	Fittings_and_furnishings	External walls
	In_built_lighting_system	Balconies
	Energy_system	Ground floor slab
	Ventilation_system	Internal walls, partitions and doors
	Sanitary_systems	Stairs and ramps
		External wall systems, cladding and shading devices
		Façade openings (including windows and external doors)
		Structure
		Weatherproofing
		Sanitary fittings
		Ceilings
		Floor coverings and finishes
		Light fittings
		Heating plant and distribution
		Cooling plant and distribution
		Electricity generation and distribution
		Air handling units
		Ductwork and distribution
		Cold water distribution
		Hot water distribution
		Water treatment systems
		Drainage system

Reuse (direct)	1.00
Reuse (preparing for)	0.90
Recycling (pure stream)	0.75
Recycling (mixed stream)	0.50
Recovery (material)	0.25
Recovery (energy)	0.15
Landfill (inert or non-haz)	0.01
Hazardous waste	0.00

Drop down lists in hierarchical order

Shell	Foundations (substructure)	Piles
		Basements
		Retaining walls
	Loadbearing 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)
Core	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
External works	Utilities	Connections and diversions
		Substations and equipment
	Landscaping	Paving and other hard surfacing
		Fencing, railings and walls
		Drainage system

Level(s) calculator. Indicator 2.4

European Commission

T2. Material circularity

TS 2.3 Design for adaptability

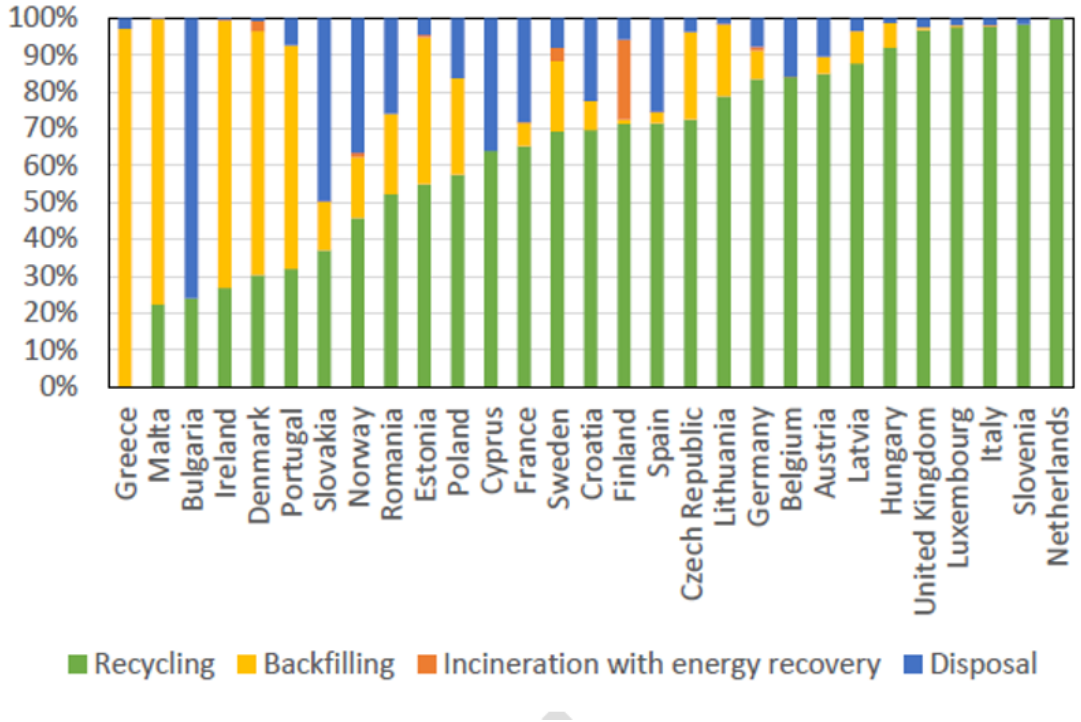
Adaptability design concept	Specific design aspect	How it contributes to adaptability	Scoring rules	(Weighting factor) and points
1. Changes to internal space distribution	1.1. Column grid spans	Wider column spans will allow for more flexible floor layouts.	Column spacing: - < 5400 mm - 5400 mm < 8100 mm - > 8100 mm - free span	(x1.5) 0 points 1 point 2 points 3 points
	1.2. Façade pattern	Narrower bays will allow for more internal space configurations	Spacing between bays: - 1350 to >1800 mm - 1350-1800 mm - 1350-1800 mm + some 900-1350 mm - 900 - 1350 mm, some bays < 900 mm	(x1.5) 0 points 1 point 2 points 3 points
	1.3. Internal wall system	Non-loading bearing internal walls will allow for changes to be made more easily to floor layouts.	- Immovable interior walls, multiple functions - Immovable interior walls, temporary structures - Movable interior walls, requires disassembly - Easily movable interior walls, partition system	(x4.5) 0 points 1 point 2 points 3 points
	1.4. Unit size and access	By ensuring that access/egress is possible for sub-divisions of the spaces, this will provide more sub-letting options.	Weighted average unit/floor plate size: - > 600 m² - 400 - 600 m² - 200 - 400 m² - < 200 m²	(x3.0) 0 points 1 point 2 points 3 points
2. Changes to the routing or type of building services	2.1 Ease of access to service ducts	Access will be improved if services are not embedded in the building structure.	Location of key service ducts: - Embedded in the floor - Between 2 building layers - Above one building layer (floor) - Below one building layer (ceiling)	(x1.5) 0 points 1 point 2 points 3 points
	2.2 Ease of access to plant rooms	Future changes of technical equipment will be facilitated if there is ease of access to plant rooms and equipment.	- Embedded in a sub-basement of the building - Located in a plant room on the roof or within an accessible patio - Located in a ground floor plant room with easy external access - Located external to the building with complete access	(x1.5) 0 points 1 point 2 points 3 points
	2.3 Longitudinal ducts for service routes	The inclusion of longitudinal ducts will provide flexibility in the location of service points.	- Connection grid in 1 direction - Cable duct in 1 direction - Connection grid in 2 directions - Cable duct in 2 directions	(x1.5) 0 points 1 point 2 points 3 points
	2.4 Higher ceilings for service routes	The use of greater ceiling heights will provide more flexibility in the routing of services.	Internal height (floor surface to ceiling surface): - < 3000 mm - 3000-3500 mm - 3500-4000 mm - > 4000 mm	(x4.5) 0 points 1 point 2 points 3 points
	2.5 Services to sub-divisions	By ensuring that individual servicing for sanitary facilities is possible for sub-divisions of the spaces, this will provide more sub-letting options.	Weighted average unit/floor plate sub-division size that can be serviced: - > 600 m² - 400 - 600 m² - 200 - 400 m² - < 200 m²	(x3.0) 0 points 1 point 2 points 3 points
3. Changes to the building façade and structure	3.1 Non-load bearing facades	Non-load bearing facades will allow for changes to be made more easily to both internal layouts and external elements.	- Bearing facade with bearing obstacles - Bearing facade, no bearing obstacles - Non-bearing facade, bearing obstacles - Non-bearing facade, no bearing obstacles Note: Examples of obstacles include bearing interior walls, columns, elevator shafts or installation ducts.	(x4.5) 0 points 1 point 2 points 3 points
	3.2 Future-proofing of load bearing capacity	The incorporation of redundant load bearing capacity will support potential future changes in the building's façade and uses.	Variable capacity: - 1,75 kN/m² - 2,50 kN/m² - 4,00 kN/m² - 5,00 kN/m²	(x4.5) 0 points 1 point 2 points 3 points
	3.3 Structural design to support future expansion	Structural designs that have the vertical strength to support additional storeys will allow for future expansion of the floor area.	Capacity to add storeys: - 1 storey - 2 storey - 3 storeys - 4 or more storeys	(x1.5) 0 points 1 point 2 points 3 points

Level(s) indicator 2.3

European Commission

T2. Material circularity

TS 2.5 Construction, demolition and excavation waste management



Treatment of mineral waste from construction and demolition 2018. (Damgaard et al., 2022).

TS2.5 sets targets considering the average recovery rate of construction and demolition waste for the EU-27 from 2020 (Eurostat), which is 89%.

The indicator is the ratio of construction and demolition waste which is prepared for reuse, recycled or subject to material recovery, including through backfilling operations, divided by the construction and demolition waste treated as defined in Regulation (EC) No 2150/2002 on waste statistics.

The indicator covers the waste category 'Mineral waste from construction and demolition' (EWC-Stat 12.1). Only non-hazardous waste is taken into account.

These goals are in line with the JRC report (Damgaard et al. 2022) regarding treatment of the mineral fraction of CDW in 2018, where disposal is defined as landfill, incineration without energy recovery and other disposal.

T2. Material circularity

TS 2.5 Construction, demolition and excavation waste management

Data extracted on 04/05/2023 11:09:03 from [ESTAT]

Dataset: **Recovery rate of construction and demolition waste [CEI_WM040]**

Last updated: 13/01/2023 23:00

Time frequency Annual

Unit of measure Percentage

TIME	2010	2012	2014	2016	2018	2020
GEO (Labels)						
European Union - 27 countries (from 2020)	:	:	87	87	88	89
European Union - 28 countries (2013-2020)	:	:	89	89	90	:

Recovery rate of construction and demolition waste in EU-27 2020

European Commission