EU Green Public Procurement criteria for buildings

1st Ad-Hoc Working Group webinar, 22 March 2022

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Housekeeping and general points

- Please have your cameras turned off and micro-phones muted.
- Time is allotted for discussion after each agenda point.
- If you have oral questions or comments, please request the floor in the chat window and unmute yourself when prompted by the chair.
- You can also type questions in the chat, but please be succinct. You can expand your point later when we respond.
- The meeting will be recorded for the purposes of writing the minutes. If the recording is to be uploaded to the Commission website, it can be edited to remove individual interventions upon request.
- 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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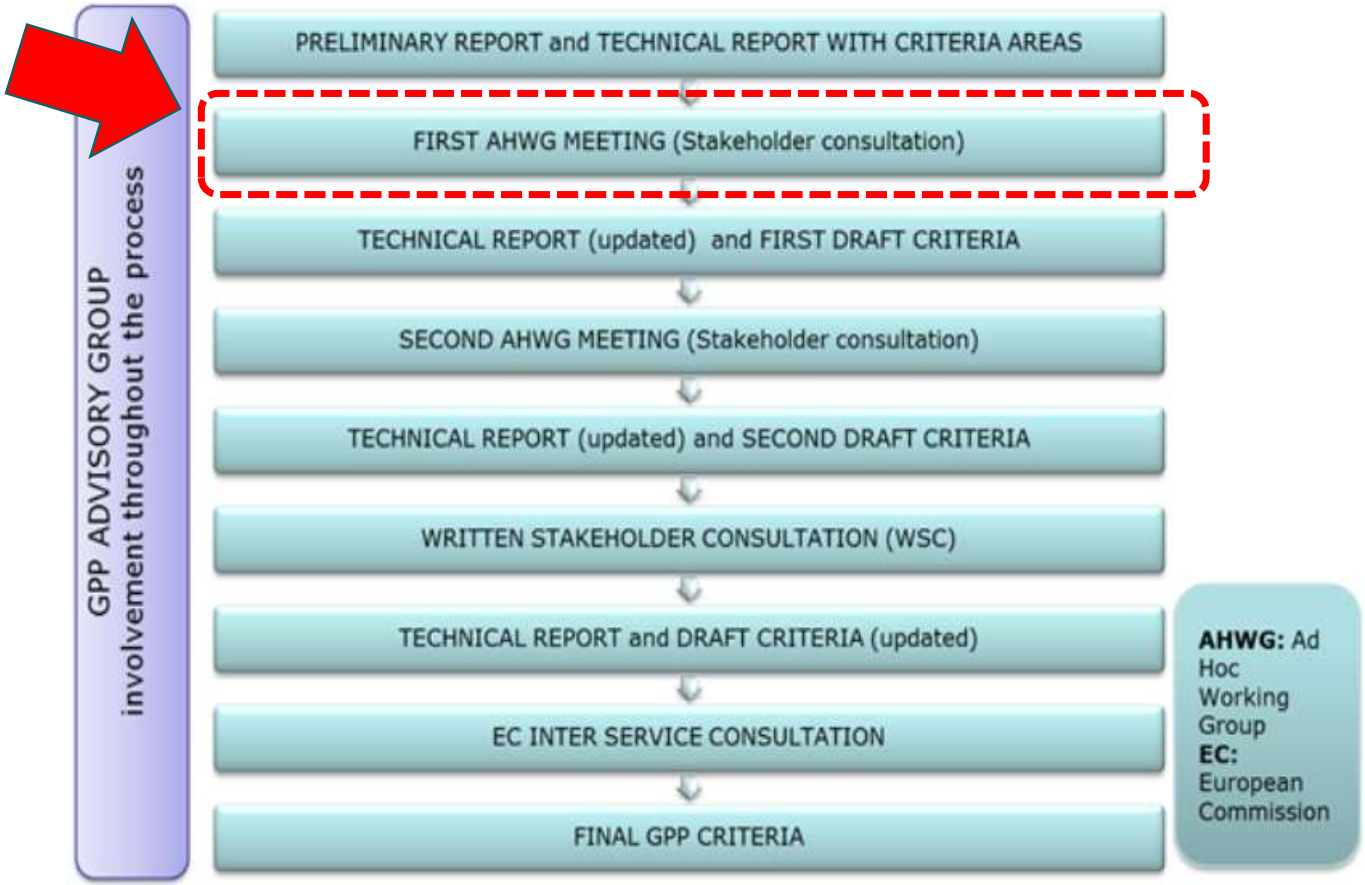
Purpose of this meeting: the process



- Part of the GPP criteria revision process.
- To explain our initial proposals.
- To obtain your reactions (today and in writing later).
- To call out for experts to form sub-groups by criteria "theme" to help form the second proposals.
- To ensure a transparent and inclusive process.

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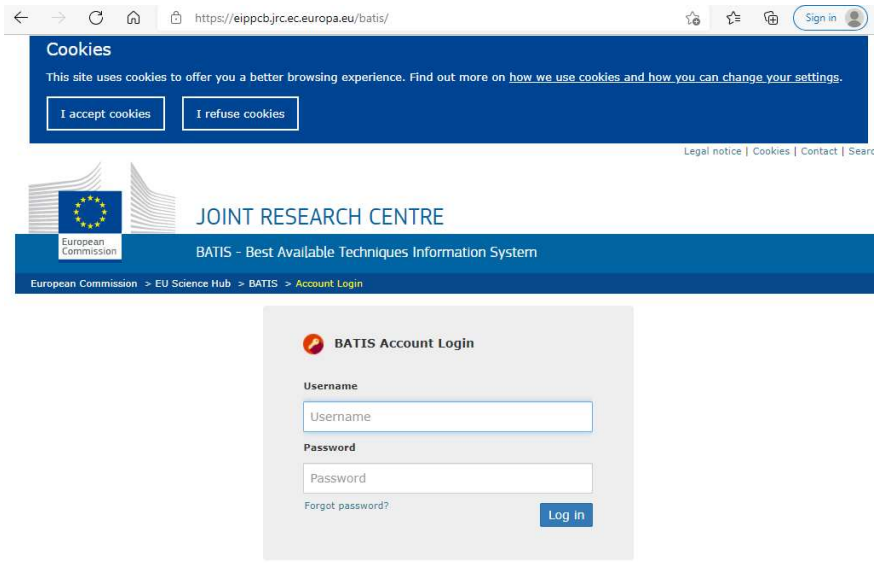
Purpose of this meeting: reactions

- To obtain your reactions in writing later:



- After today, you can also submit your comments in writing (directly on an html version of the report) via our **BATIS stakeholder platform**. This requires us to create a user account for you.
- Your comments are not visible to other stakeholders.
- After the deadline for comments (**21st April**), we publish all comments as a table, in anonymous format.
- We will send an email after the second day to check if you want to be registered (it is free, non-committal).

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Purpose of this meeting: expert sub groups

Theme 0

Building project processes, professional skills involved, costing exercises, architectural services, engineering services, BIM, procurement procedures, building or facilities management.

Theme 4

4a) HVAC etc.

- Passive designs.
- Equipment specifications.
- Same as 1a).
- Lighting standards.
- Modelling.

4b) Acoustics

- Everything!
- Technical specs.
- Verification.

4c) Electropollution

- Fundamentals.
- Verification.

Theme 5

Ongoing project with DG CLIMA and Ramboll

- Climate data and modelling.
- Flood risk methodologies in different Member States.
- Sustainable drainage – best practice and specification.

Theme 6

6) Life Cycle Costs

- Best practices for quantity surveying.
- Cost consultants.
- ICMS-3 experts.
- TCs behind relevant EN standards.

Theme 7

7) Biodiversity:

- EIA experts.
- Landscape designers and habitat creators.
- Green roof/wall design, installation and maintenance.
- Pollinator friendly landscapes.
- Light pollution.
- Market trends and best practices.

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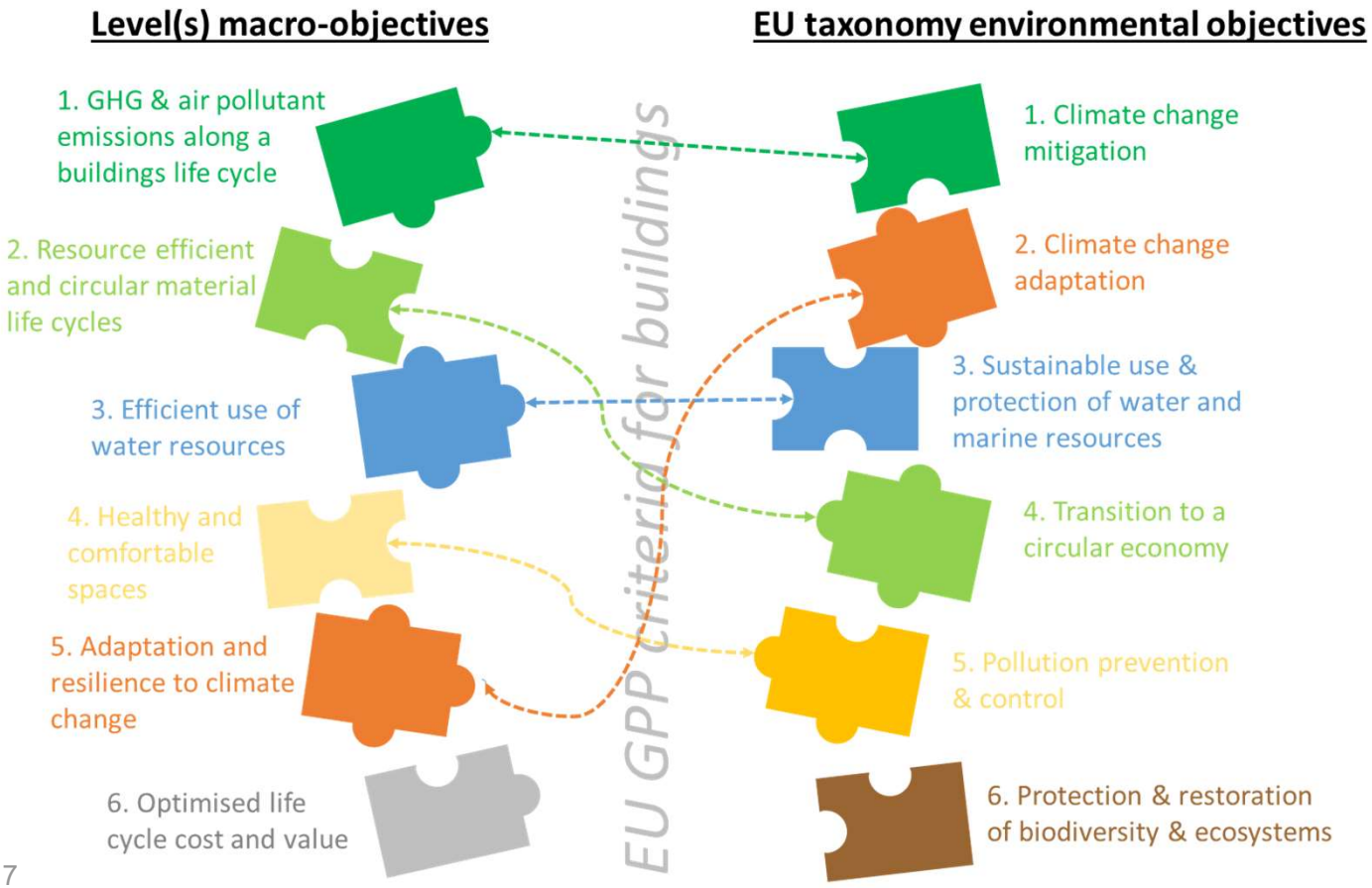
Background to EU GPP criteria for buildings



- Taking inspiration from Level(s), a building specific EU framework, and the EU Taxonomy, a globally reaching definition of sustainable economic activities….
- We found 7 “themes” for GPP criteria.
- Present criteria by theme → later organise by project type/stage.

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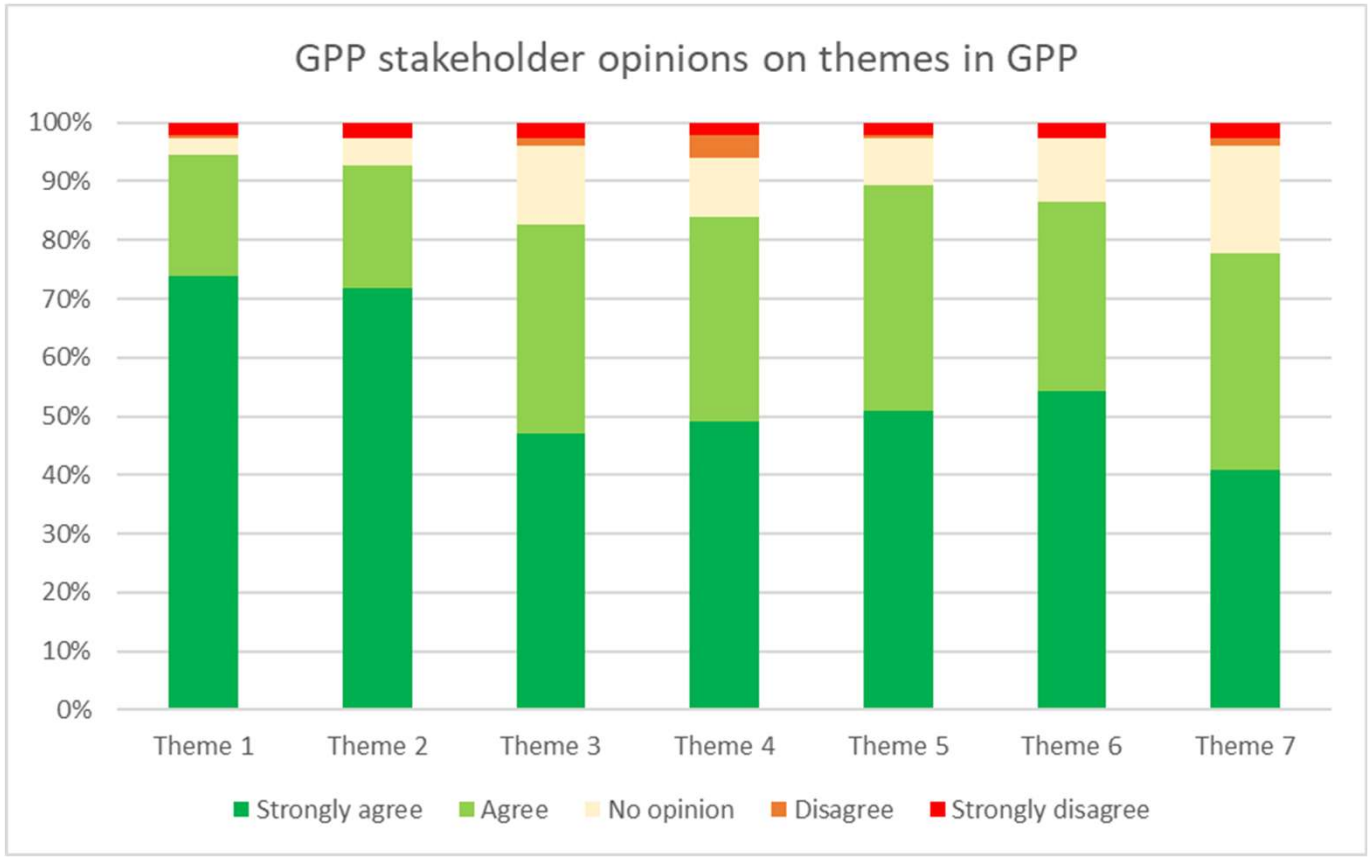
Background to EU GPP criteria for buildings



Registered stakeholders were asked their opinions about the 7 themes being used in GPP:

- All criteria had >75% positive sentiment.
- Themes 1 and 2 on energy and carbon most popular with >90%.
- Theme 7 on biodiversity slightly less support than other themes.
- *Note: Theme 3 is on water, theme 4 on comfort and wellbeing, theme 5 on climate change resilience and theme 6 of life cycle costs.*

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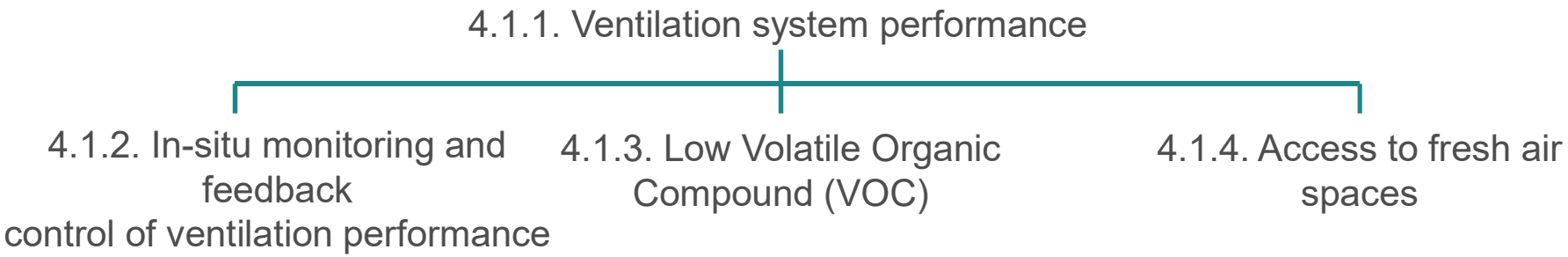
Theme 4.1 Indoor air quality



Overall aim is to optimise air quality inside buildings

Theme 4.1 Indoor air quality

Criteria summary	Rationale summary
4.1.1. Ventilation system performance: *Residential* → At least 4% total openable window area. *Schools and office buildings*→ 800 or 550 ppm limit values for Indoor CO2 concentrations + reporting SOx, NOx, ozone and benzene Operable windows in at least 75% of the occupied space are encouraged.	% Total openable window area and % of operable windows → GBRS as inspiration ppm limit values above the background natural levels (Category I EN 16798-1)
4.1.2. In-situ monitoring and feedback control of ventilation performance: (only for comprehensive). Focusing on the operation, monitoring and control of the HVAC system.	Want to encourage (but not oblige) buildings to have real-time CO2 concentration and mechanical ventilation energy consumption monitoring and log-in, visible to occupants.
4.1.3. Low Volatile Organic Compound (VOC) emission construction materials: set limits for VOCs and SVOCs present on construction materials	Test of construction materials that may be sources of VOCs and could damage the health and wellbeing of the occupants
4.1.4. Access to fresh air spaces: *Residential* → 12 or 20 m2 size of balconies	Convenient access to outdoor spaces to increase the occupant wellbeing

Theme 4.2 Thermal comfort

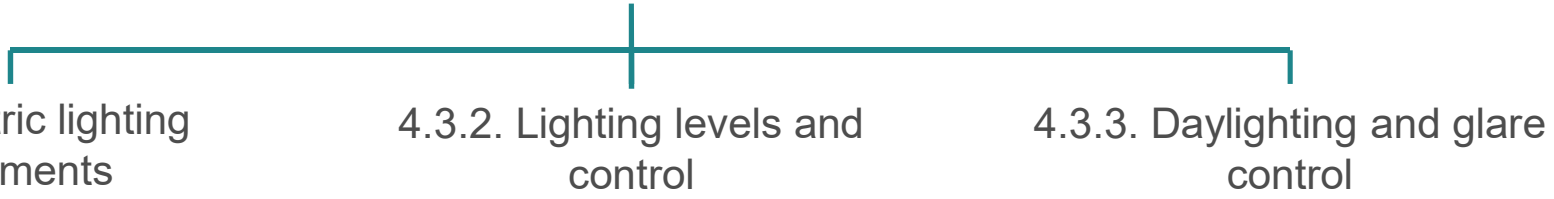
Criteria summary	Rationale summary
4.2.1. Thermal comfort: time out of range:Overall aim is to dynamically model the indoor air temperatures with hourly climate data	HVAC system to provide at least a category II (or category I) thermal environment (EN 16798-1)
4.2.2. Thermal zoning and individual thermal comfort control: The mechanical heating/cooling system shall operate to pre-defined time and temperature set-points for different building zones	HVAC should provide a thermal environment as defined in EN 16798-1 or maintain the temperature during a % of occupied hours To see in the design report the time when occupied spaces are out of the defined thermal comfort range and the extent to which they are out of range.

Themes 4.1-4.2 – Possible discussion points

- How do national and regional methodologies under the Energy Performance of Buildings Directive framework address design estimates for energy consumption due to ventilation, heating and cooling production?
- Do you think phase-change materials an important role to play in indoor temperature regulation? If yes, then what is the best way to specify this?

Theme 4.3 – Lighting

Aim → to get the right light and the right time with minimum energy consumption



- Hierarchy should be:
  - Maximise use of free (day)light first (4.3.3), then
  - Use efficient electric lighting second (4.3.1), then
  - Be able to adjust light (manually or automatically) to desired levels (4.3.2).
- Further optimisation via building energy management system (1.1.4).
- Outdoor lighting comes in 7.5.

Theme 4.3 – Lighting

Criteria summary	Rationale summary
4.3.1. Electric lighting equipment requirements: Colour Rendering Index, Correlated Colour Temperature (relevant here?), Energy class, Mercury-free and dimmable. Difference between core and comprehensive is simply on energy class and wireless nature of dimming control.	Higher energy performance reduces energy consumption for given light output. Likewise, dimming controls (automatic or manual) can reduce energy consumption and maximise occupant comfort. Level(s) is not fully developed here, so opportunity for GPP approach to inform future version of Level(s).
4.3.2. Lighting levels and control: General reference to EN 12464-1 for illuminance levels (see explanatory note). Main difference between core and comprehensive level is the sophistication of controls and the adaptive nature of electric lighting to natural light levels.	Light levels are to some extent a subjective aspect of occupant comfort. Possibility for manual override of preset light levels is important. Automatic compensation for fluctuations in natural daylight continuously ensures minimum lighting system energy consumption.
4.3.3. Daylight factor and glare control: Core and comprehensive approaches are very different. Core uses a default standard overcast sky, while comprehensive uses real daylight data in modelling.	Approaches here are inspired in part by BREEAM and WELL certification schemes.

Theme 4.4 – Acoustics

Criteria summary	Rationale summary
4.4. Weighted average sound pressure levels: Only difference between core and comprehensive is in actual limits.	Limits are generally inspired by WHO guidelines and WELL standard. But seems to be a lot more to acoustics than just sound pressure levels… Level(s) is not fully developed here, so opportunity for GPP approach to inform future version of Level(s).

- A new area for GPP, lots of background research needed, expert input sought.
- Lots of attention given to energy performance of buildings, but much less to acoustic performance.
- Need to understand how specifications can be applied at both design level and in-situ measurement.

Theme 4.5 – Electropollution

Criteria summary	Rationale summary
4.5.1. Design features to minimise exposure to building-related EMFs: Only difference between core and comprehensive is that some additional measures are specified.	All of the measures, to one extent or another, result in reduced exposure of occupants to artificial electromagnetic fields and do not need to have any impact on normal occupant behaviour.
4.5.2. In-situ assessment of wiring installation and EMFs: The actual building, in normal use conditions, is tested for different types of electromagnetic fields in parts of the building where exposure is especially important.	In-situ measures are a vital part of understanding exposure risks for occupants and also educating building users and designers about the real situation. This is more important than ever before as buildings become “smarter”, more electrified, more digitalised, more wireless and with more onsite renewable electricity generation and less natural gas.

- A new area for GPP, lots of background research needed, expert input sought.
- 4.5.2 is largely inspired by part of the Building Biology Standard*.

* https://buildingbiology.com/site/downloads/standard-2015-englisch.pdf

Themes 4.3-4.5 – Possible discussion points

Theme 4.3:

- Are criteria too prescriptive? Should a more holistic approach be used? Something like: “the lighting system will be optimised to consume less than e.g. **3 W/m2/d according to a defined occupation pattern**? And designers have the freedom to find the optimum solution? Problems with this….
- Does it make sense to specify any CCT for interior lighting?
- With sophisticated controls → consequences of poor sensor placement?
- What is the current market split for energy classes right now. Are there enough relevant products on the market with rescaled energy labels now? If new scale is A to G, then “better than A” does not make sense. Maybe a dynamic approach could be used?

Theme 4.4:

- Do we need to invent the wheel (is there no suitable wheel, or is e.g. WELL standard already a very good basis).
- Need for considerable background research into basics to explain concepts to procurers.

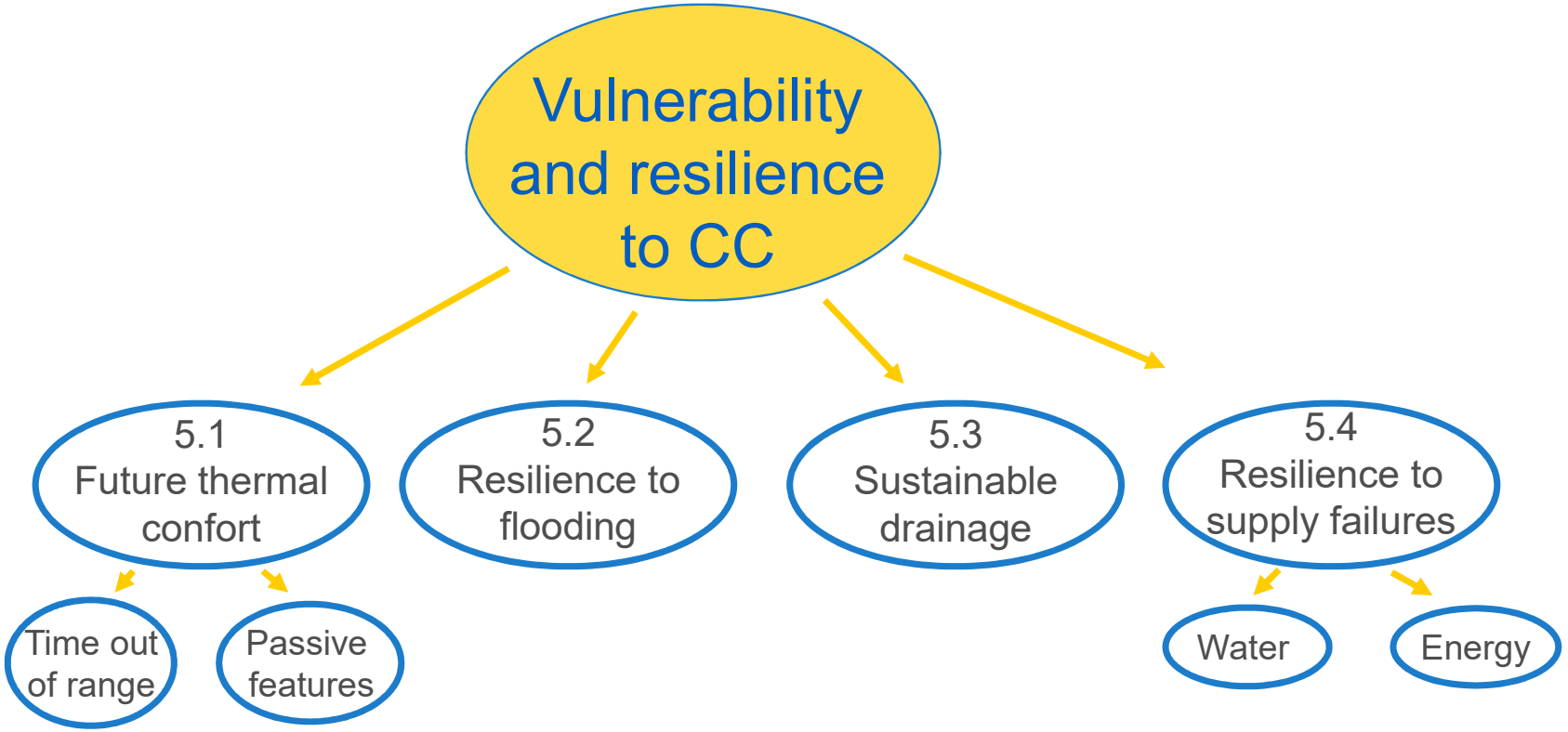
Themes 4.3-4.5 – Possible discussion points

Theme 4.5:

- Apart from the Building Biology Standard, are there any other criteria set for buildings or building spaces?
- Is continuous monitoring possible? Would continuous data be useful?
- Best sampling points for spot measurements or continuous ones?
- Relative importance of EMF exposure from outdoors and indoors?
- Who are the most vulnerable people to EMF pollution?
- What is “electrosensitivity” exactly?
- French Regulation on banning wifi in nursery schools?* How did that progress in last few years?

* https://ehtrust.org/france-new-national-law-bans-wifi-nursery-school/

Theme 5: Vulnerability and resilience to climate change



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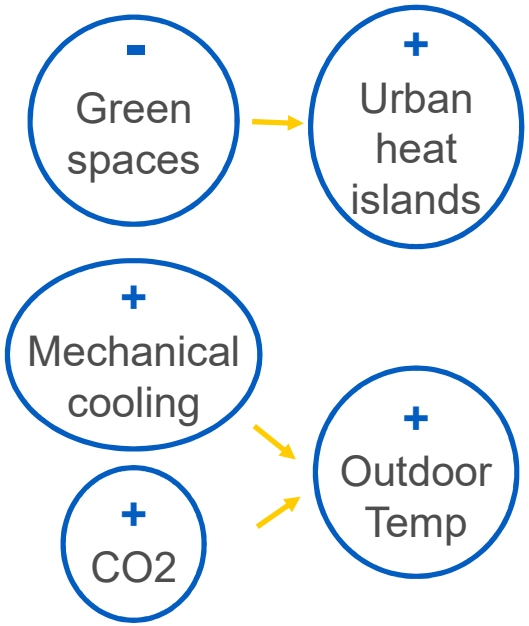
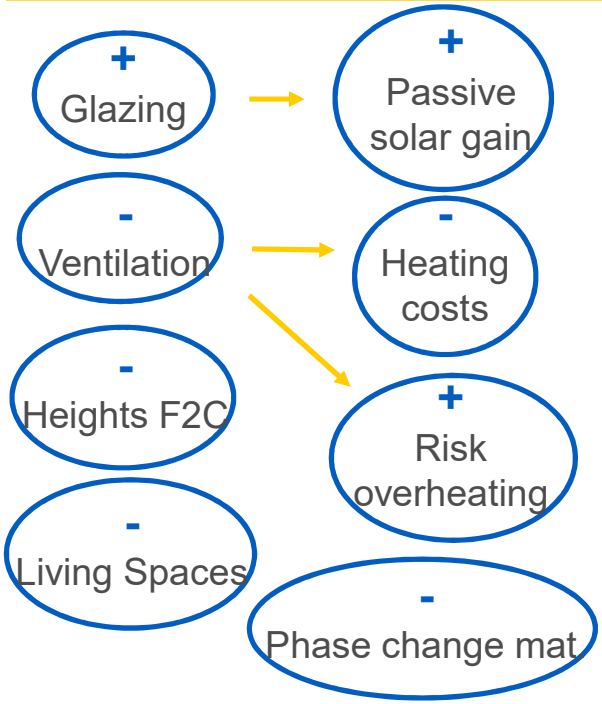
5.1. Future thermal confort

Why might future thermal comfort be different from thermal comfort today?

Environmental factors

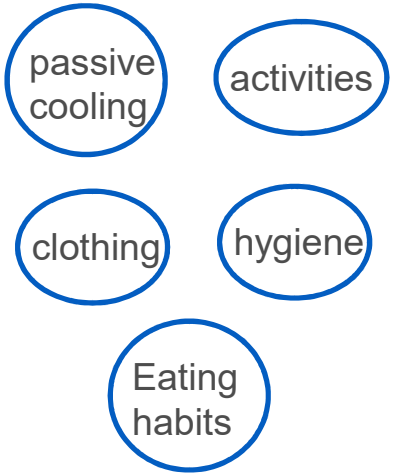


Building related factors



User-related factors

Inadequate use of :



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5.1. Future thermal confort

Why is increased overheating a problem?

Human physiology is based on thermoregulation

Most vulnerable groups to overheating:

- The elderly
- Cannot afford mechanical cooling systems
- Live in poorly designed buildings
- Limited mobility
- Work outdoors during the hottest hours.

Potential effects on Europeans in 2100:

- Mental stress
- + Adverse health effects - quality of life
- Reduce people's productivity
- Health services overwhelmed

Scenario for 2100	EU (and UK) citizens exposed to a 1 in 50 year heatwave	Annual fatalities from heatwaves
Baseline	9,600,000	2,800
1.5 °C increase	105,000,000	30,300
2.0 °C increase	172,000,000	52,400
3.0 °C increase	298,000,000	96,000

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5.1. Future thermal confort

Mechanical cooling systems to solve overheating???

Environmental trade-offs

Mechanical cooling system	Passive cooling design
• Energy intensive process • Increase electricity bills • Increase ambient air temperature • Peak power demand • Leaks Coolant (HFC) has a huge global warming factor	• More difficult/costly to retrofit in existing buildings • More design effort for new buildings • Greatly reduce the need for mechanical cooling system but not be able to fully cope with extreme heatwaves

5.1.1. Time out of range

(*Instead of current climate data, projections to 2030 or 2050)*

Goal: to reduce time and extent out of thermal range

- Time out of range. **(Projection to 2030/ 2050)**
  - No mechanical cooling system
    - **Keep indoor Temp between 18 to 27 °C a certain % of the hours occupied**
    - **Keep indoor Temp for occupied spaces Cat II EN 16798-1/ranges defined by contracting authority a more restrictive % of hours occupied**
  - Mechanical cooling system
    - **Keep Temp < 27°C during 95% of the occupied hours/any week.**
    - **Guarantee Cat II EN 16798-1 during 97% of the occupied hours/any week.**

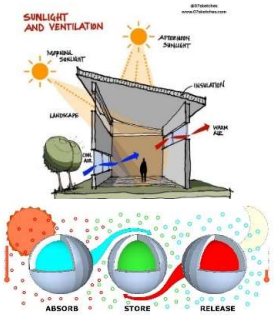
- Verification. How?
  - Clearly show time and extent out of thermal comfort range .

5.1.2. Passive features

(Instead of current climate data, projections to 2030 or 2050)

Goal: to help regulate internal temperature of the building

- Passive features **(Projection to 2030/ 2050)**
  - **Adjustable solar shading to max/min solar gain in cold/hot periods.**
  - **Cross-ventilation to allow hot air exit the building.**
  - **The use of exposed thermal mass or phase change materials**
  - **Heat exchangers excess heat from air into the water heating system.**
  - **Green elements to provide thermal mass, solar shading and cooling effects via evapotranspiration.**
- Verification. How?
  - Passive thermal aspects clearly highlighted.



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5.2. Resilience to flooding

Why is flood risk an increasing concern?

Man-made changes

- **+ urbanisation** (previous) - greenfield sites
- **Rainfall driven quickly** (conventional drainage systems/impermeable urban surface) to the watercourse. generating higher peaks in river flow
- **+ risk of fluvial flooding**:
  - downstream
  - the immediate area (drainage blocked or not designed for that amount of water)

Changes in weather patterns

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5.2. Resilience to flooding

Environmental and social benefits and trade-offs

Flooding damages buildings, economy, environment and society

Desing to	Higher embodied carbon
• elevate building • prevent the entry of flood water • easy to drain, clean and dry after flood water has entered.	• More concrete • Aditional eartworks • Limit usable space

5.2. Resilience to flooding

Goal: to reduce the potential damage caused by flooding

- Design for resilience to flooding.
  - Elevate lowest points of ingress to the building. level equivalent to that of **a one in 100 year/ 200 year** flood event.
  - Waterproof the building envelope to a level eq to that of **a one in 100 year/ 200 year** flood event plus one metre.
  - Interior surfaces of ground and subterranean floors designed and treated to be resilient to flood water

- Verification. How?
  - Flood resilience aspects clearly highlighted.

5.3. Sustainable drainage

Environmental and social benefits and trade-offs

Temperature increase due to CC generate extreme storm events

Conventional drainage system	Retentive drainage system
• Convey storm water quickly away • Its capacity can not be easily increased (urban impermeable areas can) • Quickly draining upstream, peak flowrate downstream	• - storm water runoff rates • - risk of fluvial flooding • Rainwater as alternative to potable water or irrigation

5.3. Sustainable drainage

Goal: to hold rainwater onsite and deliver similar runoff rates to greenfield site

- Design of sustainable drainage.
  - Hold rainwater onsite and deliver runoff rates as if was a greenfield site for a storm of **1 in 100 year return period of 4 hours duration** or **1 in a 200 year of 8 hours**

- Verification. How?
  - Simulation of the drainage system performance.
  - Target runoff rate stated assuming the area was a greenfield site

5.4. Resilience to mains energy and water supply failures

Environmental and social benefits and trade-offs

Reasons	Effects	Benefits of resilience
• Weather-related • Natural disaster • Accident • Deliberate intervention	• Cessation of productive activities • Compromise critical systems • Create a public health emergency	• Safe heating • Water for drinking

5.4. Resilience to mains energy and water supply failures

Goal: to have water and energy reserves in case of unexpected supply failure

- Onsite means of generating heat and electricity for **3/10** days of normal demand.
- Store of potable/ harvested rainwater for meeting **3/10** days of normal demand
- Verification. How?

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On what we expect feedback???

- Sources to find EU climate files and how to compare resolution and length of historical data coming from different sources
- Unified European approach to defining design storm events
- Unified European method for flood risk assessment
- Examples of best practice design or requirements in national/regional building codes for requirements relating to overheating, flood resilience, sustainable drainage or resilience to mains energy or water failures?
- Examples of design software used for modelling overheating, flood risk mapping or runoff rates from drainage systems

Theme 6 – Life cycle costing

- Building projects are almost exclusively CAPEX focussed.
- But due to long lifetime (e.g. 50+ years), OPEX is important.
- Investments in onsite renewables deserve to be justified if they can pay for themselves.
- Investments in energy efficient equipment or high performance building materials deserve to be justified is they can deliver savings.
- Important to account for MANEX too (reward durability and reparability).

Criteria summary	Rationale summary
6.1. Life cycle costing: Similar approach to life cycle carbon: core is a one-off assessment at some point in the design stage, while comprehensive would have three assessments, one at design stage, after completion and after a certain minimum period of occupation.	Reporting is in line with Level(s) indicator 6.1 and links to EN 15459-1. Level(s) is not fully developed here, so opportunity for GPP approach to inform future version of Level(s).

Theme 6 – Possible discussion points

Theme 6: Life cycle costing

- Opinions about the ICMS-3 standard?
- Experience with EN 15459-1?
- What about other standards relating to economic performance of buildings (e.g. EN 15463-4 and EN 16627)
- Are procurers actually using LCC for buildings?
- Would seem strange to go for Whole Life Carbon but not LCC. Underlying data and assumptions are to a large extent the same.
- Opinions about “external costs”, e.g. monetising carbon emissions in addition to direct economic costs?

Theme 7.x – Biodiversity

Criteria summary	Rationale summary
7.1. Impact of building on biodiversity Necessary EIA/screening. For comprehensive: forbidden locations	To take into consideration the impact of a new building construction on the biodiversity of the site
7.2. Extensive/Intensive green roofs: (i) areas to be covered by green roofs; (ii) accessibility of green roofs to building occupants as amenity area(s); (iii) irrigation periodicity	Including green infrastructure as means to enhance the site biodiversity
7.3. Green walls: *Placeholder Are these systems always sustainable, or are there certain specifications that must be made to optimise sustainability?	
7.4. Landscaping and habitat creation: (i) 60 or 80% of areas to be covered by vegetation; (ii) greywater to be routed through the vegetated plot area before leaving site	

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Theme 7.x Biodiversity

Criteria summary	Rationale summary
7.5.1 Ratio of Upward Light Output (RULO) and obtrusive light	Want to encourage (but not oblige) luminaire models for external lightning of the building are rated not only with a 0.0% RULO but a C3 flux code of ≥ 97 to reduce the obtrusive light within the building plot.
7.5.2 Low environmental impact external lighting:	To reduce the impact of external lightning on different species and to limit the energy consumption (classes C or B) together with a high luminaire lifetime.

Theme 7 – Possible discussion points

- Are green wall systems always sustainable, or are there certain specifications that must be made to optimise the sustainability of these systems?
- Are there any examples in the literature assessing the life cycle carbon (or cost) impacts of green roofs and/or green walls?

Next steps

- We will send you a link to a questionnaire simply asking if you want to be **registered in BATIS** (need to confirm with our secretariat if we need any other details than what you already provided).
- We will email to everyone **draft minutes** of the meeting within one week (2-3 working days for any feedback) then we will **upload minutes** to the JRC website (slides too).
- If our hierarchy is okay with **uploading the recording**, we will do this too, but only if none of you object after being consulted.
- You will have until **21st April to submit comments** on the initial criteria proposals. The way to do this is to log in to BATIS and upload your comments directly on the html version of the report. We will include guidance on how to comment this way on the same BATIS group too.
- We will launch a **call for expressions of interest in the expert sub-groups**. We may not be able to accommodate everyone, depending on how many people reply.

Thanks and until the next time!

Contact us at:
JRC-B5-BUILDINGS@ec.europa.eu ;

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