



## “Requirements supporting the Vision on Sustainable Building”



Smart-ECO WP2/Task 2.1 and 2.2 /DELIVERABLE D2:

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Action required: validation, comments from  
partners and stakeholders  
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Next step:

Next version issue:

The previous task within the SmartEco Project was to establish a vision for sustainable European eco-buildings in 2030, giving due consideration to stakeholders' viewpoints and interests. A clear set of ten key points have been diffused as our vision of what will be a Sustainable Smart Eco (SSE) Building in 2030.

While the vision describes general expectations, the next step is to establish requirements implementing this vision and expressing it more precisely, towards demands of sustainable performances.

These are no longer requirements in terms of means (e.g. in terms of type of used equipments) or restricted to users specifications, but actually performance requirements, declined on environmental, economic, social and health and comfort aspects. Obviously, a sustainable building is a building whose technical performance must be seen as an answer to a social demand, the user needs. The designers and builders role is to suggest technical solutions to meet the programme, but always considering the impacts of the technical choices on the three aspects of sustainability: environmental, economic and social/cultural. They are free to design the building and to choose equipments (in consistency with the social demand) provided that performance goals are reached. Theses expected performances must be measured or calculated, at the final handing over or during its exploitation, according to indicators or characteristics at the building scale. Theses requirements are the skeleton of the project requirements of brief.

On WP4, the product evaluation must be – for one part - the translation at the product scale of these requirements. Technical as well as non-technical innovations will be evaluated on the basis of their potential in Smart-ECO vision priorities.

These requirements are the practical and concrete expression of the vision and make reference to the actual and futures challenges for the construction sector, which are described on the extended Vision document. In this document the purpose is not to quantify the expected performance: consequently, the requirements are expressed as directive sentences. A sustainable building is the one for which the relevant questions addressing all the stages of its life cycle have been raised at the initial stage by the owner, and answered through the technical and process choices described in the brief.

The annexe will present the full tables including requirements derived from the vision, classified into:

- topics of requirement
- preoccupations/concerns
- indicators, tools, methodology associated to the evaluation of each requirement.



| Requirement general Topics | Preoccupations                   |                                      | Requirements   | Comments  |                                |
|----------------------------|----------------------------------|--------------------------------------|--|---|--------------------------------|
| Life cycle approach        |                                  |                                      | Indicators applied to measure performance must represent full life cycle | This preoccupation is prior to every following one, because it is a determining factor of each one. This way of thinking must be applied to each preoccupation. The following list of questions has to be raised regarding all the phases of the life cycle, early enough in a construction project and has to be considered at each phase. |                                |
| Ressources                 | Consumption of energy resources  | energy                               | Reduce energy consumption  | Consumption of resources includes materials resources and energy ones (embodied energy, site energy consumption energy).  |                                |
|                            |                                  | except energy                        | Reduce material consumption  | Materials and products used for the construction and O&M  |                                |
|                            | Land use                         |                                      | Reduce land use. Is integrated into town planning                        |   |                                |
|                            | Water consumption                | drinking water                       | Reduce water consumption   |   |                                |
|                            |                                  | non drinking water                   |  | Reduce impact on biodiversity   |                                |
|                            | Biodiversity                     | gene biodiversity conservation       |  |   |                                |
| Species conservation       |                                  | Reduce contribution to air pollution |  |   |                                |
| Ecosystem conservation     |                                  |                                      |  |   |                                |
| Air                        | Atmospheric acidification        |                                      | Reduce contribution to climatic change                                   | This preoccupation, due to its important had been extracted form the air pollution preoccupation. A sustainable building must be considered as one part of the answer to the climate changer and must forecast climate evolution in terms of safety, comfort, etc.  |                                |
|                            | Formation of photochemical ozone |                                      |  |   | Adapt to environmental changes |
|                            | Air pollution                    |                                      |  |   |                                |
| Climatic change            | Climatic Change                  |                                      |  |   |                                |
|                            | Adaptation to climate change     |                                      | Reduce impact on biodiversity  |   |                                |
| Water & Soil               | Soil & Water pollution           | Eco-toxicity terrestrial             |  | Reduce waste production   |                                |
|                            |                                  | Eco-toxicité aquatic                 |  |   |                                |
|                            |                                  | Eutrophication                       |  |   |                                |
| Waste                      | Eliminated solid waste           | Non hazardous                        |  |   |                                |
|                            |                                  | hazardous                            |  |   |                                |
|                            |                                  | radioactive waste                    |  |   |                                |
|                            |                                  | inert waste                          |  |   |                                |

| General topic of requirement                           | Preoccupation                         | Requirements derived from the vision                      | Comments  |
|--|---------------------------------------|---|---|
| <p><b>Cost performance and economic assessment</b></p> | <p>Life cycle cost performance</p>    | <p>Be economically efficient before the use stage</p>     | <p>The analysis must include the cost of the land on which the building stands, the costs of products incorporated into the smart sustainable building, the costs of construction - excluding products- and the costs of professional fees and other payments associated with the building during the before use phase.</p> |
|  |                                       | <p>Be economically efficient on the use stage</p>         | <p>This efficiently concerns the cost linked to : operation and maintenance, operational energy and water use, refurbishment, rent, taxes, regulatory costs, incomes, grants and other liabilities</p>  |
|  |                                       | <p>Be economically efficient on the end of life stage</p> | <p>The end of life costs is associated with the removal of the building and clearance of the site ready for further use</p>   |
| <p><b>Economic attractiveness</b></p>                  | <p>Adaptability</p>                   | <p>Be adapt to change in use</p>                          | <p>Bulk: design, structure of building, HVAC design, Location of structural elements, of building systems, of fire separations, etc., Possibility to change the energy/heat supply possibility to upgrade to building automation/management system,</p>   |
|  |                                       | <p>Be adapte to change in fuctions</p>                    |   |
|  |                                       | <p>Be adapte to new legislation</p>                       |   |
|  | <p>Efficient support for activity</p> | <p>Be fonctionnal</p>                                     |   |

| General topic of requirement                           | Preoccupation                     | Requirements   | Comments  |
|--|-----------------------------------|--|---|
| <b>Full access</b>                                     | Disabled friendly living space    | Allow flexible usages for every one (physical, mental or sensorial handicap)                                       |   |
| <b>Social attractiveness</b>                           | Age-based living space            | Be adaptable of the living space   |   |
|  | Life quality (comfort & security) | Be connected to the urban mesh. Integrated, multimodal transport plan. Optimise people flow and crowd circulation. |   |
|  |                                   | Have a visual quality  |   |
|  |                                   | Be adaptable of the cultural background (Religion, social environment)   |   |
|  |                                   | Have a cultural value: Respect of cultural heritage and indentification  |   |
|  | Safety, Security & Privacy        | Allows access to knowledge, culture, etc.  |   |
|  |                                   | Allows access to leisures and sportive activities  |   |
|  |                                   | Allows inhabitant to have the feeling to be safe (use fonction)  |   |
|  |                                   | Avoid danger for users (domestic danger : sliding, etc.)and workers (safe working conditions).                     |   |
|  | <b>Users satisfaction</b>         | Satisfaction of the user   | Occupants are free to manage their relations with the neighbourhood |
| Adapted to the present and futures owners requirements |                                   |  |   |
| Satisfaction of the local residents                    |                                   | Be user-friendly   |   |
|  |                                   | Have a cultural value: Patrimonial approach  |   |
| <b>Social accessibility</b>                            | Social accessibility              | Local residents are satisfiated with the building presence. Loadings on and benefits for neighbourhood.            |   |
|  |                                   | Promote governance : communication and participation.  |   |
|  |                                   | Have a responsibility in the social mixity plan. Promote solidarity and integration.                               |   |
|  |                                   | Inhabitant can afford to pay the services charges  |   |

| General topic of requirement | Preoccupation                                  | Requirements derived from the vision  | Comments  |  |
|------------------------------|--|---|---|--|
| <b>Indoor Air Quality</b>    | General interior air quality                   | Be healthy for its occupants. Minimise indoor air pollutants. Reduce equipment and material contribution to interior air pollution. Control fresh air renewal. Minimise radiative pollution |   |  |
|                              | VOC & Formaldehyde                             |   |   |  |
|                              | Fungi & bacterial growth                       |   |   |  |
|                              | Radioactive emissions                          |   |   |  |
|                              | Fibres & particules Emissions from             |   |   |  |
|                              | Presence of allergenic matters                 |   |   |  |
| <b>Acoustic comfort</b>      | Noise from outside                             | Be comfortable for its occupants. Reduce nuisances and elimination of unwanted frequencies. Minimise noise pollution and vibration. Noise from equipment, neighbourhood and facilities.     |   |  |
|                              | Noise within the building                      |   |   |  |
|                              | Acoustic quality of room                       |   |   |  |
| <b>Thermal comfort</b>       | Ambient temperature                            | Be comfortable for its occupants. Reduce thermal deperditions.  |   |  |
|                              | Use of Inertia                                 |   |   |  |
|                              | Level of humidity                              |   |   |  |
|                              | Air movment                                    |   |   |  |
| <b>Olfactory comfort</b>     | Odour nuisance from the neighbourhood          | Be comfortable for its occupants. clean compartment air   |   |  |
|                              | Materials odours                               |   |   |  |
| <b>Visual comfort</b>        | User comfort                                   | Natural luminosity on the building  | Be comfortable for its occupants. Reduce incomfort layout, dazzle, dark room, etc. Optimise daylight usage. |  |
|                              |  | Artificial light  |   |  |
| <b>Internal comfort</b>      | Neighbourough comfort                          |   | Minimize allergenic potential   |  |
|                              | Dust   | anti-static properties of the materials used  |   |  |
|                              |  | anti-static environment created by the facilities   |   |  |
|                              | Magnetic field                                 |   |   |  |
| <b>Water quality</b>         | general water quality in internal water supply |   | Have safe water supply  |  |