LiderA

VOLUNTARY SYSTEM FOR THE SUSTAINABILITY OF BUILT ENVIRONMENTS

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www.lidera.info

Standard of program principles
(V4.00a)

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Lead for the environment in search of sustainability

LiderA

VOLUNTARY SYSTEM FOR THE SUSTAINABILITY OF BUILT ENVIRONMENTS

Summary Presentation

This document summarily presents version 4.00a – version for built environments - of the voluntary support system for the search and certification of Sustainable Construction.

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Working version

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Contents:

introduction

Sustainability is increasingly an aspect to consider in the development of built environments and its transaction. In this context, Sustainable Construction is still a new concept, with multiple perspectives, calling for a system to support the certification of built environments based on ecological principles and the creation of good conditions of comfort and socio-economic experiences.

Practical ways of assessing and recognizing sustainable construction are increasingly becoming a reality in different countries, especially sustainable building through market systems ranging from buildings to build environments and even to sustainable communities.

Internationally, several systems have been created in order to access, recognize and evaluate sustainable construction (namely in the United Kingdom, United States of America, Australia, Canada, France, and Japan, amongst others). In the Portuguese case, the Civil Engineering and Architecture Department of Instituto Superior Técnico (the most important engineering faculty in Portugal), has been developing the foundations for a new sustainable construction support and assessment system (Pinheiro et. al 2002; Pinheiro, 2004; Pinheiro e Correia, 2005, Pinheiro, 2006).

Since 2000, at Civil Engineering and Architecture Department of Instituto Superior Técnico, with the support of IPA – Inovação e Projectos em Ambiente, Lda., the author has been developing researches for sustainable construction's technical support. Amongst these researches, stands out the development of a support and evaluation system for sustainable construction at national level, with particular emphasis on buildings and businesses, known as LiderA - Portuguese acronym of Lead for the environment in search of sustainability construction.

LiderA - Sustainability Assessment Systems is a Portuguese registered trademark, which can be (1) used immediately to support the search for solutions in the design phase and plan, (2) in the assessment of the positioning of sustainability, (3) in the case of having a proven good level of performance can be given recognition (for plans and projects) or certification (ventures under construction and operation) by this brand.

The first version V1.02 (released in 2005) was mainly intended for the building and its surrounding space. However, in view of the applications made, a version 2.0 has been developed, extending this possibility of applying the system, not only to the building scale, but also to the built environment, including the demand for buildings, outdoor spaces, quarters, neighbourhoods, sustainable communities. Version 3.0 is a version of the lifecycle centre supporting the transition to the new version 4.

The system has already been used, in different typologies of projects and by different agents, having certified projects from the plan and project phase to the one of operation. The system is referenced and recognized by different entities, from professionals to municipalities.

The main summary guidelines of the current version (4.0) are presented below.

system

LiderA system is presented in this first chapter – what is it and what it is meant for, its structure, categories, areas and criteria; its performance levels, and finally, how the final classification is obtained by weighting the different evaluation areas.

LiderA

System for the search and certification of sustainable construction

LiderA's mission is to contribute to create, support, manage and certify sustainable built environments, thereby supporting the demand for sustainable communities.

LiderA is based on the concept of re-positioning the environment in construction, under a sustainable perspective, assuming itself as a leading system for the environment. It is organized into category's that include areas of intervention and are operated by criteria, which allow the guidance and evaluation of the level of demand for sustainability.

Categories and Areas

LiderA's approach to the demand for sustainability in the built environment is based on six principles, which cover the main aspects considered in six different categories, namely:

Principle 1 – To Improve local dynamics and promoting appropriate integration;
Principle 2 – To promote the efficient use of resources;
Principle 3 – To reduce the impact of environmental loads (both in value and in toxicity);
Principle 4 – To ensure the environments' quality, by focusing on environmental comfort;
Principle 5 – To promote sustainable socio-economic experiences;
Principle 6 – To ensure the sustainable use of the built environment, through environmental management and innovation.

The six different categories are subdivided into twenty-two areas, namely:

- **Local integration (Habitat)**, regarding Soil, Natural Ecosystems, and Landscape and Heritage;
- **Resources (flows)**, including Energy, Water, Materials and Food Supply;
- **Management of environmental loads (emissions)**, regarding Wastewater, Solid Waste and other Loads (atmospheric emissions, noise and thermal and light pollution);
- **Quality of service and resilience** (environmental comfort in the areas of air quality, thermal comfort, lighting and acoustic) **and Resilience**, namely Structural Adaptation;
- **Socioeconomic experiences**, which integrates Accessibility, Space for All, Social Vitality, Amenities and Culture, Green Economy and Connectivity;
- **Sustainable use** that integrates Environmental Management and Marketing and Innovation.

Programmatic Criteria and Performance Levels

As a support for sustainable development, the system suggests a set of criteria distributed through different areas. The proposed criteria oblige not only that legal requirements are met but also that these are adopted as minimum essential requirements, in all the considered areas, including all the regulation applied to the built environment. In this case, the demand for sustainability will imply a performance that surpasses the minimum essential requirements found in present regulation.

In order to guide and evaluate the project's performance, through its evaluation process, a set of criteria, regarding every aspect taken into consideration in each area. These criteria have different levels of performance (1 to 10 or higher) that evolve with the technology, thus enabling more environmentally efficient solutions. However, the criteria and guidelines presented are intended to help select, not the best existing solution, but the solution that would improve, preferably significantly, existing performance, also from an economic perspective.

For each typology of use and for each criterion the performance levels considered (or thresholds) are defined, which indicate whether or not the solution is sustainable. The parameterization for each of them follows either the improvement of existing practices or the reference to the values of good practice, as is usual in international systems. The performance levels are numerical that from the point of view of communication are transformed into classes (from G to A +++).

Thresholds are derived from three reference points. The first is based on the most used technological performance, so the existing constructive practice is considered as usual level (Class E). In the second level, the best performance results from the best feasible constructive practice at the time (Class C, B and up to A), the third is based on the definition of the high level of sustainability (neutral or regenerative demand (Class A ++). for each use the levels of performance to be achieved.

These thresholds are adjusted for each use and can be prescriptive (indicating the solution to be considered for example 1m² of solar panel for sanitary hot water) or performance (% of m³ of sanitary hot water produced by renewable energy which allows to be supplied from solar energy, biomass or otherwise).
Thus, there is a framework for each of the uses that particularizes which are the levels that reach the various classes.

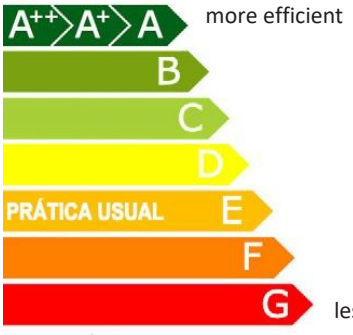

Fig. 1 – Performance Levels

According to LiderA, the sustainability degree by area is measurable in growing classes of good performance: from practice (E) to classes C (over 25 % in practice), B (37.5 %) and A (50 % or factor 2). In the best performance class there is, in addition to class A, the class A +, associated to an improvement factor of 4 and the A ++ class associated with an improvement factor of 10 compared to the initial situation considered, or even A +++ that categorizes a regenerative situation.

Weighting

In general, within each area the programs (criteria) have equal importance so that their grouping allows classification for each of the 20 areas. To obtain an added value, the final conjugated classification is obtained by weighting the 20 areas. To that end, through weighting and consensus, weightings were obtained for each of the areas, the most important area being Energy (15 %), followed by Quality of Service (9 %) and then a set of three areas: Water, Materials and Green Economy (7 %).

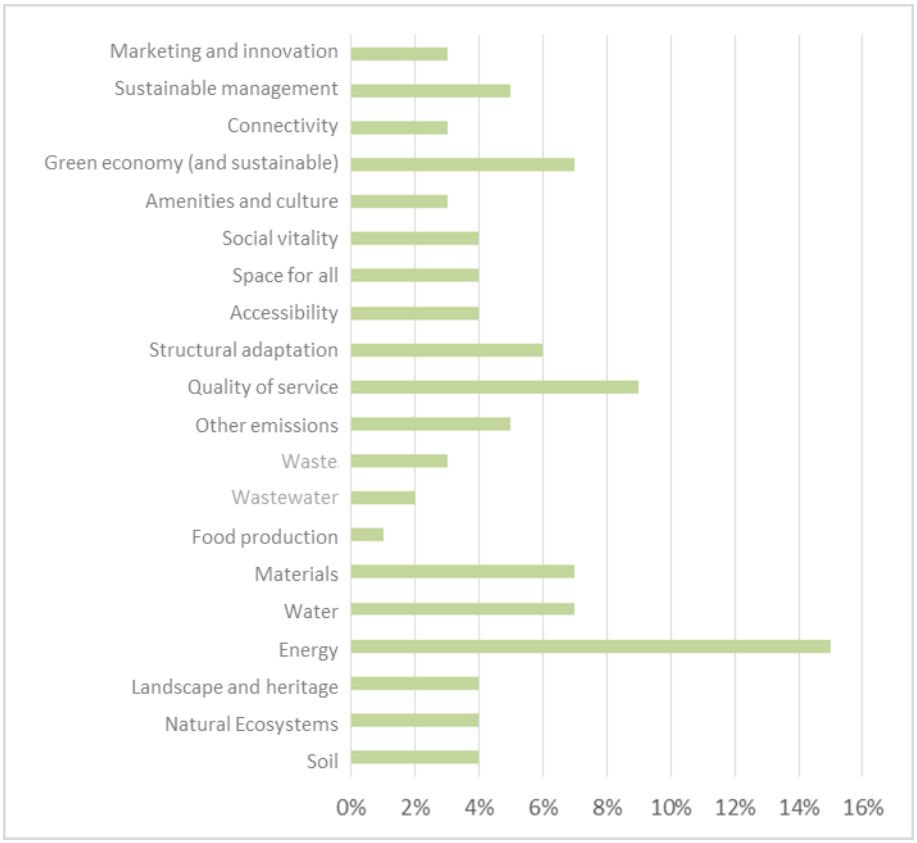

Fig. 2 - Weighting (in percentage) for the 20 areas of LiderA System (V4.00)

The performance grouped in the areas of local integration, resource consumption and environmental loads outlines the strict environmental performance, which together with the service quality, socioeconomic and sustainable use perspectives, aim to achieve performance in the pursuit of sustainability. The 6 categories are divided into 2 areas (Figure 3).

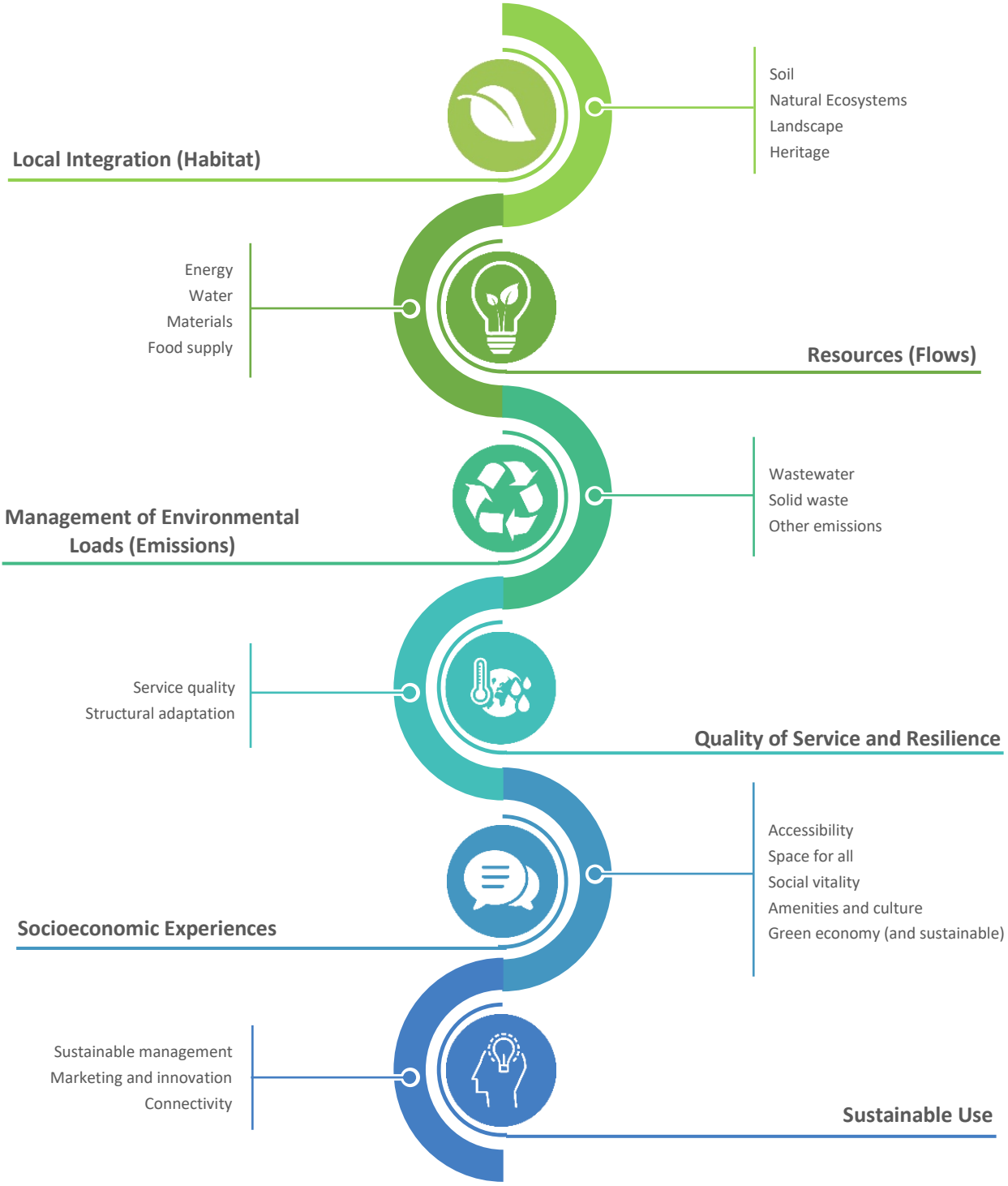

Fig. 3 – Scheme of categories and areas of LiderA System

Areas considered mandatory programs (30) and volunteers (10), each of the considered assessment of the life cycle (environmental, social or economic) and its quantification ensures supplementary bonus.

Programmatic

To operationalize the search for sustainability, in version 4.0 there are 40 programmatic criteria are predefined. These criteria are numbered from 1 to 40 (suggested as P #). Next, various aspects will be focused on the areas and criteria of the various aspects of LiderA system.

criteria

category

Local integration (Habitat)

Project location is one of the key elements in the building's initial development. Conditionings like soil occupancy, ecological land changes and landscape, the area needs for development, the ecological network and landscape and heritage enhancement are associated with the choice of location and the delimitation of any building or developing area environmental performance.

Table 1 – Local integration: considered areas and criteria

category	area	wi	criteria	nº crit.
Local integration (habitat)	Soil	4%	Territorial organization	P1
			Enhance soil functions	P2
	Natural Ecosystems	4%	Ecological valorisation	P3
			Ecosystems services	P4
6 criteria	Landscape and Heritage	4%	Landscape valorisation	P5
12%			Built heritage valorisation	P6

Soil

Soil is an extremely important resource. The decision on where to build and how to use the site for built interventions is a major aspect of sustainability, because it will structure the project's development. Soil and its occupation is an important factor when selecting appropriate sites for construction, and thus a challenge for sustainability, since there is the need to prevent the increase in occupancy of natural areas, to reduce impermeable and occupied areas. Thus, LiderA highlights the importance of valuing local territory (P1) and environmentally optimize deployment (P2).

When regarding local integration, the support criteria focus on the following aspects:

Territorial organization (P1) - it is more suitable to build in places that assure low soil impacts and in its uses generate sustainability in the deployment area, and valorise global environmental characteristics such as, for example morphology. The possibility to valorise a degraded place is a relevant aspect to prioritize.

Enhance soil functions (P2*)* - on one hand the building's footprint must be reduce, without exceeding the height limits (of the surrounding buildings) established for the area, on the other hand, deployment should be adequate to the constructed spaces and building's operation area, in order to ensure its proper implementation, given the environmental space's sensitivities.

Natural Ecosystems

Natural ecosystems cover a multitude of aspects, either in open not humanized spaces, or in humanized spaces, in many cases not covered by the construction area. In ecosystems, the challenges to promote sustainability, highlighted by LiderA, focus on the protection of natural areas, on the mitigation of impacts on biodiversity, on maintaining the existing natural, on the increase and enhancement of ecological dynamics (P3), and on reducing the increased fragmentation of habitats, through habitats interconnection (P4).

Ecological valorisation (P3) - the ecological value of places is often diminish by human interventions, however if adequately directed towards the valorisation of ecosystems, namely its fauna and flora, it can increase the existing values. This can occur through the increase of local biodiversity and valorisation of natural zones.

Ecosystems services (P4) - the built environment should integrate and respect existing natural areas, minimizing any unwanted effects, namely by encouraging the protection of major natural habitats and the introduction of continuity zones in between, in order to safeguard these areas. This criterion intends to minimize natural areas and biodiversity depletion, to protect habitats and to prevent ecological fragmentation.

Landscape valorisation (P5) - the project should contribute to enhance the built environment and, if possible, it should ensure connections between naturalized landscape and the surrounding built environment, as it contributes to the integration of development and enhancement of natural components. This must be done as a contribution for the integration of natural and urban dynamics.

Built heritage valorisation (P6) - the built heritage can have a great influence in the place's identity and characteristics, therefore it should be preserved and developed (rehabilitated or restored). The adoption of conservation practices, as well as the built environment's preservation and enhancement is a major issue that should also be considered in the surrounding areas. These measures can be materialized by designing architectural forms according to the existent surroundings.

Landscape and Heritage

Changing local landscape integration capacity of ventures is an important and complex issue to consider, given its partial. In built environments, it is important to highlight the ability that interventions and projects need, to ensure the landscaping integration or the valorisation of the site (P5) according to objective parameters, such as: volume and orientation of the building, urban morphology and relevant views. When addressing heritage, LiderA highlights the possibility to protect and enhance local built heritage (P6).

category

Resources (flows)

Energy, water, material and food resources consumption have a key role in sustainability, in balancing the environment, as its impacts can be very significant and may occur at different stages in the projects life cycle.

The possibility of punctual food production, which, although not affecting directly the operation of buildings and areas, can contribute: to food's timely provision, to an occupation, connected to nature, to reduce transport footprint and integrate food process in urban zones.

Table 2 - Resources: Areas and criteria considered

category	area	wi	criteria	nº crit.
Resources (flows)	Energy	15%	Passive Performance	P7
			Energy Systems	P8
			Carbon management	P9
	Water	7%	Moderate water use	P10
			Local water management	P11
	Materials	7%	Products and materials of responsible origin	P12
8 criteria			Durability of built environments	P13
30%	Food supply	1%	Contribution to local food production and access	P14

When regarding the Resources category, the support criteria focus on the following aspects:

Energy

Energy consumption activities has increased, and not always according to an efficient perspective of creating wealth (reflected in the indicators of energy intensity). Energy production and other combustion activities, originate emissions, such as CO2, one of the greenhouse gases (GHGs).

The energetic challenge, according to LiderA, should be based on an effort to reduce any unnecessary consumption, considering the possibility that being connected to energy certification (P8). Whenever possible, it is also important to adopt bioclimatic and passive design solutions (P7), as well as, energy production from renewable sources, which will translate in low-carbon emissions (P9).

Passive Performance (P7) - passive design methods may be the key component to achieve an effective approach for reducing energy consumption needs. In buildings, as well as in public spaces, the adoption of passive strategies (bioclimatic) is essential to reduce energy needs. The adoption of passive design is one of the most important measures due to its influence during the buildings operational phase, and in some cases, a good passive design can avoid the use of mechanical systems (HVACs) in buildings.

Energy Systems (P8) - this criterion aims at buildings energy consumption and energy performance certification (Energy and Air Quality National Certification System). The buildings' energy requirements should be analysed in the scope of normal comfort conditions, which transforms into specific measures to reduce energy consumption.

Carbon management (P9) - the carbon footprint establishes the balance between the emitted carbon and global energy consumption, either from renewable sources or non-renewable ones. The ideal scenario would be the exclusive use energy use from renewable sources, aided by equipment's efficiency.

Moderate water use (P10) - sustainable use of water requires a strategy that reduces consumption, which can be achieved through adequate and efficient water use. This can be enhanced through the implementation of water reuse mechanisms or, if possible, through the decrease of potable water use for secondary purposes (such as using grey water in toilet flushing).

Local water management (P11) - it is fundamental to contribute to natural water cycle through the naturalization of water management on site, in particular by increasing surface runoff and possible peak / flood effects mitigation during rainfalls. A naturalized system must be created for storm water management, allowing its infiltration, as well as providing drainage lines and the retention of pollutants in areas with potential contaminants.

Water

The water cycle is essential for life in general, ecosystems, human beings and several other activities. The challenge for water demand in sustainability, according to LiderA, is based on seeking the reduction of potable water consumption (P10) by joining its good quality to more noble and demanding uses and in seeking to manage waters (P11) in the intervened areas.

Products and materials of responsible origin *(*P12*)* - the availability and use of local materials (up to 100 km), can contribute to the mitigation of transport needs, including their energy and emissions, encouraging construction integration and local economy dynamics. Use of materials with reduced environmental impact, including the use of environmentally certified materials (the eco-label or other recognized certification systems), recycled materials or materials with enhanced environmental performance.

Durability of built environments (P13) – materials consumption is directly related to their durability, and the build environments' durability, hence the importance of durable materials matters, especially in the building envelope and networks. In a sustainable strategy, the built environments' durability should be increased, in order to minimize materials consumption and maintenance costs, often associated with the renovation and demolition phases of the existing buildings or the construction phase of new ones.

Materials

The buildings and associated activities are placed as the largest consumers of materials, which during their lifetime occupy land, consume minerals, fossil fuels, other natural materials, and produce waste. The production and use of building materials have a significant impact on the environment and on project costs. In this sense, in the search for sustainability, it is important to reduce the amount of materials used and seeking, if possible, the use of local, recycled and / or renewable materials, ensuring that they have low environmental impact.
In the materials area, according to LiderA, the search for sustainability is based on seeking use of materials of responsible origin (P12) in particular in promoting the use of local materials and materials of low environmental impact, if applicable in durability (P13).

Contribution to local food production and access *(P14)* - maximize the adequate local food production possibilities, especially in outdoor spaces and occasionally in the interior of buildings. The local production can begin to create a level, although low initially, of local autonomy, thus contributing to greater sustainability.

Food supply

Local food production will contribute, in a timely manner, to maximize the chances of adequate food production. This local production could start creating a level, although reduced, of awareness to ecological cycles and local autonomy, thus contributing to greater sustainability.

category

Management of Environmental Loads (Emissions)

The impacts of loads generated by the built environment and related activities results in wastewater emissions, air emissions, solid waste, and thermal and light pollution. This strand focuses on buildings and structures, as well as the close relationships established with outside areas.

Table 3 – Management of Environmental Loads: Areas and criteria considered

category	area	wi	criteria	nº crit.
Management of Environmental Loads (Emissions)	Wastewater	2%	Wastewater management	P15
	Solid waste	3%	Waste management	P16
	Other Emissions	5%	Noise management	P17
5 criteria			Management of atmospheric emissions	P18
10%			Other loads	P19

Wastewater

Effluents are one of the areas with high impacts on the environment. In the wastewater area, the demand for sustainability, according to LiderA, is based on ensuring an adequate level of wastewater treatment at the site and on the possibility of reusing wastewater (P15). Thus, the strategy adopted is based on the reduction of effluents, on the separation of sewage types, and on the maximization of water reuse. Finally, the type of treatment should be compatible with the means to discharge wastewater, its sensitivity and possible reuse.

When regarding the Management of Environmental Loads category, the support criteria focus on the following aspects:

Wastewater management (P15) – encourage the use and implementation of local treatment systems, reducing the strain on municipal treatment plants and, whenever possible, using appropriate biological systems and treatment systems with low-intensity in energy and materials. The biological wastewater treatment is a good example of a treatment system that may contribute to later re-usability. Reduce water consumption based on the reuse of wastewater (namely grey water or black waters) for activities that do not require drinkable water, such as toilets discharge, irrigation and outdoor decks washing, green spaces maintenance, car washing, amongst others.

Solid waste

Waste management strategies should be based on a reduction logic, notably by ensuring the reduction of waste, by ensuring hazardous waste management. It should also encourage the valorisation of waste, in all phases of the building's lifecycle, increasing the percentage of waste recovered, either in construction, in operation, or in deconstruction. At LiderA, the approach is based on waste management (P16) following the hierarchy of the 4Rs strategy.

Waste management (P16) – the reduction of waste production during the building's various construction/use phases, should be seen as an objective that must be achieved. That reduction can be achieved by technical solutions and reused materials. These measures will only be efficient, if this goal is agreed by all involved parts, and if it is considered during all phases of built environments lifecycle. Promote the selection of materials and respective waste, taking into account the possibility of reduced production of hazardous waste, as well as considering the conditions for storage and appropriate treatment.

Noise management (P17*)* – obtaining acceptable noise levels is crucial either for human life or for animals. This objective can be promoted through noise sources control inside buildings or in open public spaces.

Noise management

Noise is a major problem and one of the main complaints in the environmental approach. This should, therefore, in accordance with LiderA' demand for sustainability be reduced by the outset of noise sources (P17), with implications on current activities in the venture.

Management of atmospheric emissions (P18) – it applies mainly to particles and potentially acidifying substances (SO_2 and NO_x). The combustion activities create particle emissions of SO_2 and NO_x (amongst others); therefore, reducing these emissions is essential. Furthermore, established legal specifications must be complied, particularly by reducing the sources and loads of atmospheric emissions.

Management of atmospheric emissions

The reduction of air pollution emissions should be the focus of attention, as highlighted by LiderA, by reducing the flow of atmospheric emissions (P18), which applies in particular, to the level of particles and / or potential acidifying substances (SO_2 and NO_x).

Other loads (P19) - the heat island effect is mainly caused by changes in the site's thermal balance and has a global impact, which is corroborated by the unpleasant environmental conditions verified in some public spaces. The main goal is to reduce thermal changes in the built environment. During night periods, artificial light may appear harmless to natural species, but it constitutes another source of pollution, which, if not contained, can interfere with ecosystems and also with the development of human activities and, therefore, should be mitigated.

Other loads

In the search for sustainability, according to LiderA, it is important to enlighten thermal pollution (P19), which includes the heat island effect, caused by changes in the site's thermal balance, and the pollution generated by outdoor artificial lighting, that should be minimized to reduce any interference on ecosystems and human activities.

category

Quality of Service and Resilience

When considering current lifestyles, it is essential to consider that buildings and outdoor environments should not only meet the demands of efficiency but also customer satisfaction, so that any intervention at this scale is prominent and necessary, and should be definitely equated. There are no hard and fast rules or unique solutions, that allow the creation of that respond to human comfort and well-being. However, there should be quantification methods that can demonstrate the effectiveness and efficiency of the adopted solutions. These solutions must be linked to specific strategies that depend on the occupants, on the activities and on the program itself. The following factors may be useful when considering different scales and answering several questions, therefore facilitating the occupant's ability to modify and interact with interior space's air quality, thermal environment, light and sound.

Table 4 – Quality of service and Resilience: Areas and basic criteria considered

category	area	wi	criteria	nº crit.
Quality of Service and Resilience	Service Quality	9%	Environmental quality and other aspects	P20
			Safety and control of risks (human)	P21
4 criteria	Structural Adaptation	6%	Climate adaptation and other natural hazards	P22
15%			Resilience and adaptation	P23

Quality of service

The quality of service of the built environment is one of the essential aspects, in the broad sense it covers the LiderA strands as the local integration, resources, experiences and sustainable use, strictly in this program focuses on the comfort that is one of the factors with major repercussions on living beings. Buildings live more than 80% of the time so that the conditions of air quality, thermal, acoustic and luminous comfort are essential aspects in the quest for sustainability that must be ensured (P20)..

Regarding to quality of service and resilience, the first programmatic criterion focuses on the environmental quality of the service (P20), including as a minimum basis the comfort that is divided into four dimensions:

- Air Quality Levels - it is necessary to evaluate the various elements that can influence such quality, not only indoors (such as the natural ventilation phenomena, VOCs emissions and micro-contamination) but also outdoors (wind conditions and especially the air quality levels). The presence of vegetation can improve the outdoor air quality.
- Thermal Comfort - comfort is a fundamental element in buildings, therefore, this criterion is intended to achieve appropriate temperature and humidity levels or wind speeds during the operation phase over a certain period, for most of its occupants. It is also essential to create comfortable conditions, appropriate to outdoor activities.
- Lighting levels - the ideal light levels for buildings' outdoor and indoor environments, above all, must take into account not only the activities that are being developed in each of its areas, but also its occupants' characteristics. The possibility of using natural light for these purposes is extremely important.
- Acoustic insulation - this criterion aims to enhance the maintenance of acceptable noise levels for activities and to achieve acoustic comfort levels within the built environment, therefore minimizing the disruption resulting from inadequate results, which do not lie within the appropriate boundaries. In this case, various solutions can be adopted, including the protection of activity areas.

Safety and control of risks (human) (P21) - it is important to think carefully about the type of space that is proposed in a venture and its possible future uses in order to reduce the conditions in which any risks may arise from the developed activities, dangerous substances or acts of crime and vandalism, amongst others.

Safety and control of risks (human)

The safety of people and property is an essential element to be ensured in the service of built environments, whether for acts of vandalism or crime, as well as the effects of anthropic pollution and risks of hazardous activities.

Climate adaptation and other natural hazards (P22) - the area and space shape condition, in general, for their own fruition. It should be understood that any use, not suitable for these features could jeopardize them, especially when considering natural threats (natural catastrophes, strong winds, earthquakes, floods, etc.). The ventures or space's shapes and materials may also interfere with the user's safety; therefore steps to reduce risks should be taken.

Climate adaptation and other natural hazards

The safety of people and property in the face of climate change, including extreme effects, as well as other natural hazards such as seismic hazards, should be considered.

Resilience and adaptation (P23) - to create the capacity to strike an appropriate balance in the face of significant changes in systems and to evolve to ensure essential minimum services such as water, energy, waste and so on.

Resilience and adaptation

Capacity for variations and to ensure an adjusted minimum service, covering its various components such as water, energy and others.

category

Socioeconomic Experiences

Sustainability is based on the environmental dimension previously discussed in conjunction with the socio-economic dimension, which from the human point of view can be framed in the socio-economic experience.

Socioeconomic experience is a category that relates the society directly with the space or area in which it lives. Social and economic aspects are an integrant part of this interaction, namely: the accessibility and mobility aspects, that cover the type and ease of people's movements; the life cycle costs, that establish a better relationship between price and quality; the available amenities type and quality, considering which affect the population's quality of life; the type of social interaction that takes place amongst the population; the economic diversity that, covers a greater or lesser variety of spaces with different functions and economic functions; and finally, control and security, that ensures a more or less secure relationship within individuals, and between population, and its surrounds.

It is intended that these aspects are tackled in a way that ensures an ever more versatile and efficient socioeconomic experience and structure, when considering population's life quality.

Table 5 - Socioeconomic Experience: Areas and basic criteria considered

category	area	wi	criteria	nº crit.
Socioeconomic Experiences	Accessibility	4%	Active mobility	P24
			Efficient transport systems	P25
	Space for All	4%	Inclusive built areas	P26
			Inclusive spaces -Accessible and safe streets and public spaces	P27
	Social Vitality	4%	Flexibility and complementarity of uses	P28
			Contribution to community well-being (Health, ..)	P29
			Social responsibility (and vitality)	P30
	Amenities and Culture	3%	Friendly amenities	P31
			Contribution to culture and identity	P32
	Green Economy (and Sustainable)	7%	Low life cycle costs	P33
12 criteria			Contribution to circular economy	P34
22%			Contribution to green jobs	P35

With specific regard to socioeconomic experience, the basic criteria focus on the following aspects:

Accessibility

Accessibility allows to ensure the good conditions of pedestrian accesses and others as well as public transport and it is essential to ensure their good condition.

Active mobility (P24) - create conditions for active mobility through the creation of infrastructures (pedestrian, bicycle paths) that allow its use and the existence of parking, are important aspects to be developed in the mobility of the building and if relevant in the surrounding area involved.

Efficient transport systems (P25) – optionally, conditions can be created to ensure transport efficiency, preferably those of a more ecological character, valuing the proximity to public transport or the creation of means of ecological transport in the enterprise, which ensure access to that node of transport, or complement need.

Space for All

The need to ensure spaces not only for people with special needs, but for all (since we all end up having potentially special needs) in a logic of inclusive spatial solutions are essential.

Inclusive built areas (P26) - first, it is necessary to remove any barriers that often exist in buildings and outdoor spaces, that prevent or difficult the access of disabled people, contributing to the alienation of society members. The careful planning of buildings and their characteristics, providing the creation of zones, accessible to all users (disabled people or people with special needs) as a way to ensure inclusive solutions, could eliminate this.

Inclusive spaces - Accessible and safe streets and public spaces (P27) – optionally, this demand for inclusive solutions must cover the surrounding public spaces if there is intervention in this area.

Social Vitality

The complementarity of uses, the conditions for community well-being and interconnection with the community, and contributions of social responsibility are elements that stimulate social vitality.

Flexibility and complementarity of uses (P28) – this criterion shall ensure the existence of modular and adjustable zones that can respond to changing needs. This aspect helps to maintain the built environment and all areas tailored to its occupants and user's needs, enhancing their ability to adapt to different uses and avoiding obsolete spaces.

Contribution to community well-being (Health, among others) (P29) – optionally if applicable it is desirable to ensure good health and well-being active also in common spaces and in the community.

Social responsibility (and vitality) (P30) - optionally if applicable it is desirable to promote interconnection to the community and contribute to socially responsible actions and to energize vitality.

Friendly amenities (P31) – user's proximity to these amenities should be seen as an asset for the local environment, and if its enjoyment is rational and meets the capacities of such amenities, it creates a win-win relationship between the different parties. Therefore, the system suggests the enhancement of local amenities, the promotion of their presence, creation, maintenance and access in the proximities, and the preservation of its functions.

Contribution to culture and identity (P32) - optionally consider the possibility of valuing culture and identity (constructive solutions, information, among others).

Amenities and Culture

The proximity of users to amenities should be seen as an asset the built environment, and if their enjoyment is rational and meets the capacities of such amenities, it creates a win-win relationship for the various parties. Thus, an important aspect to take into account is the fact that buildings and respective surroundings, should contribute constructively to the interaction with the community and potential users.

Low life cycle costs (P33) - is an essential and important parameter for the success and viability of a construction, since it is a way to maximize the profitability of the building and the built environment, while minimizing its maintenance. The various stages of buildings (design, operation and demolition) must be taken into account, but the most important is the phase of operation, given that it is the longest period of time.

Contribution to circular economy (P34) - contribute or create conditions for the circular economy and endogenous local activities. It is important to have services, zones and buildings that have economic activities, including a part that is monetarily accessible, preferably include activities of circular economy, thus allowing to ensure the existence of economic activities and access to different users.

Contribution to green jobs (P35) - Optionally, if possible, contribute to or create conditions for the most environmentally friendly services and activities and / or local employment. It is important that there be jobs located in the local built environments, in order to avoid wasting time on the trips. This measure improves the quality of life by reducing the pollution caused by the commuting of commuters if their employment is not located near their place of residence.

Green Economy (and Sustainable)

Economy is one of the three main components of sustainability. Therefore, economic diversity can contribute, to better living conditions of a building, outer space, development or urban area. According to LiderA the following issues should be considered: flexibility and adaptability of spaces to new uses, encouragement of local economic dynamics and contribution to the creation of local work.

category

Sustainable Use

The final result in terms of performance and level of sustainability depends on several components such as the one designed and constructed, the systems adopted and the way the built environment is used and maintained.

The management of environmental aspects, both by providing information to stakeholders, or by applying a management system, can ensure the consistency and fulfilment of criteria and solutions with impact on environmental performance, a continued improvement and control dynamics of environmental projects and the promotion of innovation.

Amongst the relevant aspects, focused above, are the following: the level of information that facilitates good working conditions and the users' awareness. These factors contribute to spread environmental concerns and ensure that new ventures and areas have the ability to be properly used and that they are adapted or have the ability to adapt, over time, to the needs of their occupants and users.

The adoption of environmental management modes and practical innovations, ensure a good performance by the building, while proving its ability to adapt over time, thus contributing to sustainability issues.

Table 6 - Sustainable Use: Areas and basic criteria considered

category	area	wi	criteria	nº crit.
Sustainable Use	Connectivity	3%	Connectivity and Interaction (Digital Systems)	P36
	Sustainable Management	5%	Information management for sustainable performance	P37
			Maintenance and management for sustainability	P38
4 criteria			Monitoring and governance	P39
11%	Marketing and Innovation	3%	Marketing and innovation	P40

With specific regard to Sustainable Use, the basic criteria focus on the following aspects:

Connectivity

Information technologies, Wi-Fi, IoT - internet of things, allow interactions between different users and equipment, which contribute to interconnect, communicate and act.

Connectivity and Interaction (Digital Systems) (P36) - Ensure the possibility of digital connectivity, its good functionalities and resulting interaction in a safe and appropriate manner. Including mechanisms of interaction with the community should be possible to the whole population and to the neighbourhood.

Sustainable Management

The management of environmental issues, either through environmental information, or through the applicability of environmental management systems, can ensure consistency and the implementation of solutions with consequences to the environmental performance, a dynamic control and continuous environmental improvement of the venture, for a proper environmental use. Management mechanisms should also be ensured in order to guarantee proper construction, operation and maintenance of built environments.

Information management for sustainable performance (P37) - develop solutions and information for a more sustainable performance of the user. Sustainable information and practices are important, such as simplified mechanisms and environmental specifications that enable the actors involved (construction workers, occupants, maintenance staff, etc.) to understand and operate the built and outer more adequate, ensuring a good sustainable performance.

Maintenance and management for (P38) – if relevant, an environmental management system and environmental management mechanisms should be adopted for the development (formal, certified or not), as systems can contribute to a better management and maintenance of the buildings' and outdoor areas' performance, corroborating the good environmental performance. The ability to control is a fundamental aspect, since occupants should be able to control comfort levels according to their needs (called adaptive comfort). Functioning in the building, such as ventilation (mechanical and natural) and lighting levels (artificial and natural), can be controlled, and control of both ends up involving control of temperature and humidity, concentration of pollutants and noise levels , among others.

Monitoring and governance (P39) – if relevant, it is important to ensure performance monitoring and to involve stakeholders in governance for sustainability, interlinking to monitoring. Ensure conditions for participation and governance of users, so that they can actively suggest and participate in the decision-making processes, which may even change their quality of life and their conditions of comfort, enjoyment and living environment built.

Marketing and Innovation

Marketing and innovation can help to create a meaningful change in the quest for sustainability and in the evolution to a good performance towards a more sustainable and efficient set.

Marketing and innovation (C40) – innovate and promote sustainability. One of the elements that should be strengthened and encouraged, in implementing solutions that promote sustainability, is the adoption of completely innovative solutions that improve the environmental performance of the previously suggested criteria.

Application

The following chapter is intended to present an introduction to the application of the LiderA system - how to look for and how to ensure sustainability by LiderA.

application

The proposed system (Pinheiro, 2005), offers different possibilities of implementation: plan, design and life cycle management (construction, operation, rehabilitation, renovation, restoration and end of life); allowing monitoring at different development stages of the project's life cycle.

LiderA's application is aimed to cover different spatial scales, ranging from the urban scale (areas or districts), to the buildings and materials scale. To this end, the enterprise must meet the disposed prerequisites and demonstrate a good performance in the criteria that compose the evaluation system.

Apply to search for Sustainability

The LiderA system can be used either to develop plans, projects and sustainable building solutions, or to make assessments in order to reach a final output, by weighting the different areas, because of an investigation, developed by various agents involved, in the construction and data collection process on the ground. This system can be applied at various stages, and in fact, is particularly relevant in the enterprises' design phase, as it can obtain a performance value that can be improved for the construction phase. Since its early stages, each enterprise must adopt an environmental policy (or demonstrate its implementation), which should be suitable for its development and environmental characteristics, when considering the sustainable principles, referred before.

In the initial phase of each project, the Developer, being responsible for commissioning operations and awarding a contract to the winning design bid, defines the characteristics, conditions and solutions that should be implemented in the venture. There must be an environmental policy that is able to provide that the undertaken work is conducted with safety, hygiene and healthy conditions for all the involved stakeholders. The developer shall establish general rules for planning, organizing and coordinating the project during all phases.

The Developer should be aware of the planning conditions needed to execute the proposed work and thus anticipate all the risks inherent to each type of work. In subsequent interventions or necessary adjustments, he must ensure that the technical compilation is updated and that the adopted solutions are flexible and modular, in order to provide the building with a new use, in the future, if needed.

Fig. 4 - Development phases and implementation of the LiderA approach

Planning phase

In terms of the planning phase, the approach principles must be disclosed and defined, according to an environmental policy. The Agenda 21 and the Sustainability Guidelines present in the Portuguese General Buildings Regulation were taken into account as criteria for comparison, at this level. This approach consists of the following principles: to promote proper location and environmental integration, to attain efficiency in consumption and flow management, to reduce the impact of environmental stressors, to achieve adequate comfort, to pursue socio-economic adaptability, and to foment a consistent environmental management and a proactive search of innovation.

These principles, established at the ventures' policy level, should be applied at an early design stage and define performance as the commitment, which needs to be met in order to achieve them. This commitment should be formalized, as an ongoing strategy towards the sustainability of enterprises, in which a set of sustainable principles must be assumed.

The pre-design phase should include a program that discriminates and delineates the Developer's intentions of seeking a good performance in the search for the venture's sustainability. The initial strategy should be guided by the LiderA principles, which are based on the following components: local integration, resources, environmental loadings, environmental comfort, socioeconomic experience and sustainable use.

This approach should include, in each category, the principles that will regulate the entire project through the design stages and throughout all stages of approval. These principles are the following:

Principle 1 - To Improve local dynamics and promoting appropriate integration;

Principle 2 - To promote the efficient use of resources;

Principle 3 - To reduce the impact of environmental loads (both in value and in toxicity);

Principle 4 - To ensure the environments' quality, by focusing on environmental comfort;

Principle 5 - To promote sustainable socio-economic experiences;

Principle 6 - To ensure the sustainable use of the built environment, through environmental management and innovation.

Design Phase

The preliminary design phase is based on the principles and performance demand levels viable for each specific situation. This is the stage in which solutions and performances must be defined and compared with the benchmarks of sustainability, given the enterprises' performance within the various criteria. As more details are available, from the design phase to the project's implementation, prescriptive measures must evolve in order to be complemented with higher performance levels.

On the intermediate design phase the designers must take into account local characteristics (topography, built environment) to enable an optimal orientation, a good integration, and the adoption of exterior permeable surfaces. These considerations will positively influence the environmental comfort and the socioeconomic experiences. When considering the resources, the principles to be followed consist of the balanced management of water and energy, creating a strategy that encompasses passive systems and bioclimatic architecture and enabling the possible use of active systems, the sustainable use of materials, given their life cycle and embodied energy, and the adoption of the concept of local food production. The principles inherent to environmental loadings refer to the requirements defined in the pre-design stage: the existence of a proper place for placing waste, that appeal to their separation and recovery, the treatment of waste water and the possible collection and reuse of rainwater.

The final design phase should assess whether proposals (solutions) presented follow the strategies outlined initially and are in accordance with the principles outlined for the areas of LiderA (ensuring an overall coverage and the path to sustainability, which was initially set and analysed in the pre-design phase). At this stage, it is important to analyse the strategic options and designs previously completed, in order to assess their compatibility with the desired program, both in previewed costs (budget), strategic assessment demand level of sustainability.

The licensing and approval phase includes various stages of the project and as a main challenge, it is ambitioned that these stages are also a target for an investigation regarding environmental and social performance, therefore testing sustainable performance.
In this case LiderA has an important role, since it functions as a help tool that will attempt, at every step of the approval process, to evidence the most relevant performance issues to consider in each project.
In this context, LiderA is used as a guide and starting point for analysis, monitoring and evaluating measures applied in the search for sustainability, that need to be submitted to the respective process.
At this stage, documents needed for approval are presented, accompanied by the project's thoughtful approach to sustainability, according to the perspective of the LiderA system. This integrated approach aims to address the possibilities inherent to the search for sustainability of buildings, based on the licensing and approval process.
At the construction documents phase, details of constructive solutions and proposals originally outlined in previous phases must be checked. At this stage it is important to detail all construction elements as well as procedures and rules that will be applied or followed. Solutions that require the use of renewable energy, water collection, the reduction of energy and water consumption and use of certified materials are aspects that require more detailing, in the resources category. When considering waste, intervenient should detail sites for waste disposal, such as "Eco-points", as well as spots for composting. In environmental comfort, it is necessary to ensure good levels of lighting and noise insulation, good wall insulation, glazing and roof insulation.
In air quality, detailed solutions that promote natural ventilation should be considered. The use of green roofs and facades are other aspects that could be detailed, since they promote an improvement in air quality and the reduction of atmospheric emissions. Another important aspect is related to adaptability, since the detailing of modular and flexible solutions in a building, allows it to adapt to new uses in the future, if necessary.

Construction Phase
In construction, renovation, rehabilitation, restoration, amongst others the implementation of solutions and the definition of materials ought to be considered in order to ensure a good environmental performance, as well as the creation of management mechanisms that structurally reduce environmental impacts.

Operation Phase
In the operation phase, the logic is to support the sustainable use and management, in order to insure to good performance levels, indicated for the specific situation. At this stage, the solutions and their levels of performance can be compared with the sustainability benchmarks found, in order to determine the venture's positioning and possible improvements.
Its application for development may go through an approach involving the following eight steps:
(d1) contact the development team, that should be informed of the type of project in question, and its characteristics, in order to determine the thresholds and the adequate performance levels;
(d2) involve LiderA advisor (list available on site), agreeing the scope and steps to follow;

(d3) online registration, on LiderA's site, available in www.lidera.info;
(d4) advising on sustainability, involving the positioning evaluation;
(d5) proposals for performance level and benchmarking;
(d6) facilitate the search for sustainability to LiderA officer;
(d7) implementation of solutions (in planning, designing, constructing and operating phases);
(d8) periodic assessment of LiderA's positioning, supported the collection of proofs that show it clearly, regarding future certification and improvement suggestions, for example for future management.

Recognition and Certification

When developments show good performing solutions, at the design or plan stage, these can be proven through a prescriptive form or through their performance. If they show performance levels of in the categories and areas considered or in their overall performance achieve level C or above, they can be recognized by LiderA. Nevertheless, developments must have the evidence, that concurs such performance and supply it to Team LiderA for the verification process.

In the case of construction and operation phases, the system's approach focuses on actual available evidences. If the verification process allows overall performance levels equal or greater than Level C, enterprises can be certified by LiderA.

In order to be recognized or certified, the project must show a good environmental performance, which can be verified by existing evidences (documents), and from thereafter carry out:

(c1) contact the LiderA team in order to certify and agree on evaluation dates;

(c2) register online, on LiderA's site, available in www.lidera.info, on the link "contacts", and complete the available form;

(c3) systematization of evidences of the project or venture that will be certified;

(c4) verification by an independent party of the performance levels found;

(c5) if performance levels top Class C or higher, attribute Certification / recognition by LiderA brand;

(c6) monitoring.

Fig. 5 – LiderA's certificate

Info

The following pages are intended to present important information, such as contacts and references.

Info

In order to use for development or for certification, the interested identities that wish to use the system, must agree on how to apply it with the LiderA team, so that the corresponding elements can be provided.

To this effect, interested entities should contact project coordinator by e-mail: manuel.pinheiro@lidera.info. To supplement the present summary presentation, more detailed information can be found on the website: http://www.lidera.info

Manuel Duarte Pinheiro, CERIS / DECivil/IST

17th March 2019

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Annexes

In the following pages guidelines – lines of best practice - are provided, as well as a LiderA synthesis, with criteria, and ways to measure environmental performance.

Guidelines – lines of best practice

In the following tables, summary indications of the LiderA system are presented, regarding the criteria, good practice lines, measuring modes, and relevance to different life cycle phases.

In general, it is assumed that the applied solutions have periods of low economic return, when compared with the buildings' lifespan that ranges from 50 to 100 years. Therefore, a payback period of around 7 to 10 years, is considered a reasonable economic payback. Solutions with longer payback periods should be envisaged in a specific context, which may exceptionally justify their adoption, though this should not operate as a rule. As a result it is assumed that is better to adopt solutions that are economically viable.

The depth and detail of information required to support and highlight the performance of each criteria should depend on the characteristics of the area to intervene and respective sensitivities, as well as the size and complexity of the project. Thus, for projects of limited size, the performance indications that can be proven expeditiously may be sufficient, while for larger projects, evidence must be quantitative and detailed.

Following the logic of selecting criteria, a number of these are not necessarily disjoint, for example, the reduction energy consumption and equipment efficiency, renewable energy and carbon dioxide (CO_2), recycled materials and renewable low impact materials. This logic suggests the enhancement of sustainability by combining the best environmental conditions. It also provided a set of prerequisites that need to be fulfilled in different areas.

Of the 40 criteria, 10 may not be exceptionally unapplied (marked in a different colour in the criterion column in the following two tables) if they are not adjusted in the type of intervention (which must be based), and their weight distributed within the respective area.

The criteria focus on the possibility of performance, assuming the ability to integrate and enhance landscape and fulfilling architectural quality. The proposed criteria are a base core that can be adjusted, given the type of use of the venture (areas) and the environmental aspects considered.

LIDERA Sistema de Avaliação de Sustentabilidade

Table 1 - LiderA System, guidelines and application in each stage of built e

LEVEL 1 **LIDERA 4.01** **LIDERA SUSTAINABILITY BUILDING EVALUATION SYSTEM - ENSURE PERFORMANCE FOR SUSTAINABLE CONST**

CATEGORY	AREA	WiA	Pre-Req.	Wi P	CRITERIA	No.P	Objective	Measuring
Local Integration (Habitat)	Soil	4%	Y	2%	Territorial organization	P1	Develop territorially. Promote the use of sites already with intervention that need rehabilitation or infrastructure.	Define all areas considered relevant (ecologically sensitive or degraded (constructed / contaminated)) for evaluation (in m2) before and to be carried out in the intervention. Find the constraints of the PDM.
				2%	Enhance soil functions	P2	Ensure the natural functions of soil. Reduce occupation of the whole lot or area to ensure soil functions.	Define all areas considered relevant (gross and deployment, in m2) for the evaluation, per building, and its number of floors. Relation of the area of the floors / ground area (reduce the area of implantation of the building and related areas); Index of not built area: 100 - [((deployment area) / (total lot area)) x100]
	Natural Ecosystems	4%	Y	2%	Ecological valorisation	P3	Promote local ecological value, include vegetation and local or adapted species.	Definir o número de espécies existentes e/ou introduzidas no local, incluindo arbustivas, e áreas de vegetação natural e autóctone antes e após a realização da intervenção e a área por elas ocupadas, em percentagem da área total.
				2%	Ecosystems services	P4	Increase ecosystem services and their interconnection between different zones, including with the surrounding.	Evaluate the percentage of existing habitats in order to promote relationships between species.
6c. / 12%	Landscape and Heritage	4%	Y	2%	Landscape valorisation	P5	Contribute to enhance landscape, integrating local elements and qualifying architecturally and culturally.	To elaborate a characterization of the surrounding area and to make a list of the elements that contribute to the insertion and adaptation of the building, namely: architectural design, natural aspects, materials, form and aesthetics of the building.
12%				2%	Built heritage valorisation	P6	Contribute to enhancement of built heritage, promoting the use of materials and built buildings (rehabilitate).	Evaluate and quantify the measures that at the level of the building contribute to the preservation and appreciation of the surrounding heritage.
Resources (Flows)	Energy	15%	Y	5%	Passive Performance	P7	Ensure bioclimatic performance. Improve the passive performance of the building.	Estimate kWh / m2.year energy conditions and costs exclusively from bioclimatic measures and passive solar performance. Norma PassiveHouse
				5%	Energy Systems	P8	Ensure energy efficiency in energy systems.	Calculate or monitor energy consumption and verify the values of energy certification or energy efficiency
				5%	Carbon management	P9	Contributing to reduce carbon emissions. Use renewable energy and low carbon solutions.	Determination of the reduction of the level of CO2 emissions from renewable energy sources and the amount of energy produced in total.
	Water	7%	Y	5%	Moderate water use	P10	Use water rationally for service, ensuring efficient systems.	Define consumption of drinking water in liters / hab.day (or equivalent).
				2%	Local water management	P11	Contribute to manage water locally.	Define the percentage of local runoff before and after the intervention, draw up a list of measures implemented to reduce run-off and local water management with their efficiency. Define rainwater consumption in liters per inhabitant (% or equivalent) in the building.
	Materials	7%	Y	6%	Products and materials of responsible origin	P12	Promote the use of materials with good environmental performance and other responsible origins.	Estimate or calculate the quantity (in kg or equivalent) of materials that are of responsible origin (low impact) or that were purchased, manufactured or produced in the region or in Portugal, stipulating their percentage in relation to the total used.
								Estimate or calculate the amount of materials (in kg or equivalent) that have environmental certificates and that are of low impact, recycled and renewable materials not coming from the building to be reconverted, materials from the building to be reconverted, stipulating its percentage of the total used, OR list of harmful materials not included.
8 c. / 30 %			N	1%	Durability of built environments	P13	Increase the durability of materials, constructive solutions and systems, in cases that are not temporary, throughout their lifetime.	percentage of increase the durability of materials used in the building compared to common practice, measuring its lifetime.
30%	Food Production	1%	Y	1%	Contribution to local food production and access	P14	Consider the possibility of producing food (or aromatic herbs). Promoting the use of local food or facilitate their access.	Define: - Production of local plant foods (degree of diversity) - Local production of animal foods (degree and diversity)
Management of Environmental Loads (Emissions)	Wastewater	2%	Y	2%	Wastewater management	P15	Reduce wastewater, separate gray and black waters, treat and reuse treated pre-water.	Determine the flow of effluents produced in liters per day (or equivalent) and determine the quantity that is treated on site (technical requirements of the capacity of the treatment system) and the level of treatment of each fraction of the effluents.
								Determine the rate of re-use of treated wastewater (in liters / hab.day),% of total, or equivalent.
	Waste	3%	Y	3%	Waste management	P16	Reduce the amount of waste and create the conditions to be able to recover, reuse, recycle and recover materials and energy (4Rs).	Determine the production in kg / hab.ano (or equivalent) of solid urban waste.
								To draw up a list of the hazardous waste produced and used and the materials and products from which they are generated and the measures taken to reduce, dispose of, dispose of and dispose of it properly and safely. This listing can be the result of the execution of a questionnaire to the residents, performing random samplings in solid urban waste.
								Determine the amount (kg or equivalent) of recycled waste in the building (or development).
	Other Emissions	5%	Y	3%	Noise management	P17	Reduce noise sources and manage acoustic emissions (location, schedules, insulation).	Identify sources of noise from internal sources (for Buildings or Rehabilitation) or external sources (for Communities or public space) (for the operating phase)
5 C. / 10 %				1%	Management of atmospheric emissions	P18	Reduce sources of atmospheric emissions, their loads and toxicity, if possible take advantage of thermal or other components.	Determine emissions of particulates, SO2, NOx (and / or other pollutants that contribute to the greenhouse effect) in kg / m 2 per year (or equivalent) by calculation methods or simulators or by measures implemented to reduce these emissions and their efficiency OR by conducting monitoring.
10%				1%	Other loads	P19	Reducing the heat island effect and lighting (avoid radiant pollution).	Elaborate a listing with the interventions implemented to reduce the effect of heat island and light pollution.

environments lifecycle (1/2) (V4.01a)

	Possible Interventions				
	Essencial	Extremely Important	Important	Reduced Importance	Almost Meaningless

RUCTION

		APPLICABILITY FOR EACH PHASE			
Good practice guidelines	No.P	Plan	Project	Construction / Renovation	Operation
Territorial organization that allows balanced development of the territory. Analyze the state and the use of the soil to intervene. Determine the restrictions and guidelines of the Land Use Plans. Systematize	P1				
Ensure the natural functions in the soil (infiltration, vegetative support). Ensure a percentage of permeable area of the soil against the total of the lot or zone.	P2				
Development should enhance local ecological value: all local fauna and flora species (particularly endemic) should be preserved, therefore allowing an increase of the area's ecological biodiversity.	P3				
Promoting a continuous green structure in surrounding areas: green roofs, green facades, trees and green spaces, in order to ease the interconnection of habitats. Avoiding barriers/obstacles between physical habitats or within the same habitat, introducing new structures (burrows, nests, etc.) that encourage species development.	P4				
Fostering landscape integration or enhancement	P5				
Preserving the buildings with value - Formal relationship of the building with the surrounding heritage (built) and suitability of the use to the type of environment. Life cycle impact reduction (preservation and reuse of materials). Evaluate the global life cycle.	P6				
Adopt bioclimatic and passive solar performance practices, covering Passive house criteria.	P7				
Reduce energy consumption - monitoring of energy consumption and verification of energy certification values.	P8				
Reducing the level of CO2 emissions from renewable energy sources and the amount of energy produced in total	P9				
Ensure water efficiency, reduce the consumption of primary water from the Public Supply Network by defining potable water consumption in liters per inhabitant (or equivalent) by reading the consumption from the public water supply or from extraction of a body of water using public accountants or own or carrying out simulations that estimate such consumption. To adopt systems that have high levels of water certification (A, A +, A ++)	P10				
Promote the management of local waters, including local run-offs before and after credit, and draw up a list of measures implemented to reduce run-off and ensure effective management of local waters. Define rainwater consumption in liters per inhabitant (% or equivalent) in the building.	P11				
Promote the use of environmentally certified materials, with environmental practices or produced in the region or in Portugal.	P12				
Increase the durability of materials used in the building compared to common practice, measuring their life span. Or more durable materials and solutions to avoid their degradation by the different agents (physical, environmental and others) throughout their life cycle. Adjust the materials to the conditions (exterior, bathrooms, ...). To design using criteria for the durability and protection of materials to different physical agents, environmental, such as solar radiation and water, biological (pests, insects, vegetation), pollutants, degradation processes (for example corrosion)	P13				
Allow local production of diversified foods in the building	P14				
Use of water reused for irrigation of green areas and other outdoor areas, flushing supply, etc., since it is not put in danger to human health, environmental and other associated structure (animals, vegetation).	P15				
Encourage the integration of users in defining the specification of finishing solutions to reduce waste intervention and production needs. Reduce the amount of waste produced and foster the 4Rs hierarchy, boosting its value.	P16				
Identify sources of noise from internal sources (for Buildings or Rehabilitation) or external sources (for Communities or public space) (for the operating phase) and reduce the noise levels produced	P17				
Elimination or reduction of devices operating with combustion stoves, water heaters, boilers, tobacco smoke, transport, particles carried in the feet and carpets, vehicles parked inside.	P18				
Reduce heat island effect and lighting	P19				

LIDERA Sistema de Avaliação da Sustentabilidade

Table 2 - LiderA System, guidelines a

LEVEL 1 **LIDERA 4.01** **LIDERA SUSTAINABILITY BUILDING EVALUATION SYSTEM - ENSURE PERFORMANCE FOR SUSTAINABLE CONST**

CATEGORY	AREA	Wi	Pre-Req.	Wi P	CRITERIA	No.P	Objective	Measuring
Quality of Service and Resilience	Service Quality	9%	Y	7%	Environmental quality and other aspects	P20	Ensure environmental quality, comfort and associated services.	Check the appropriate natural ventilation rate, taking into account its type and incidence by division; Verification of measures implemented to reduce VOCs (if there are materials, carpets, insulation, among others, which could be sources of VOC) and reduction of indoor air contamination (micro-contamination).
								Determine the levels of temperature (ºC), humidity (in%), and air velocity (m / s) recorded in the interior, throughout the year. Qualitative evaluation (Plan / project phase after evaluation)
								Determine the lighting levels (in lux or equivalent through a luxmeter) their spatial distribution in the different divisions and the activity to be developed in each one.
								Determination of the noise level in dBA in each occupied main area. Set the values for each threshold according to the values required in the General Noise Regulation.
				2%	Safety and control of risks (human)	P21	Ensure an adequate level of security against human risks (intrusion and others).	Carry out measures to reduce crime and vandalism in the building and adjacent areas. Application of measures of control and inhibition of crime and vandalism in two distinct but complementary aspects: building and adjacent public space, and measures at the level of public space are the most preponderant.
4 C. / 15 %	Structural Adaptation	6%	Y	3%	Climate adaptation and other natural hazards	P22	Contribute to reducing potential extreme effects and adaptation to climate change, as well as ensuring reduction to other natural hazards.	Identify climate and other risks and measures to ensure adaptation.
15%				3%	Resilience and adaptation	P23	Create capacity to find an adequate balance for significant changes in systems and to adapt in a dynamic and evolutionary way.	Verify if the project contemplates studies and implementation of measures of resilience to events, as well as its evolutionary capacity.
Socioeconomic Experiences	Accessibility	4%	Y	3%	Active mobility	P24	Contribute to the development and access systems and solutions of active mobility (pedestrian, cycling, etc.).	Check for available and implemented mobility solutions.
				1%	Efficient transport systems	P25	*Promote access and development of efficient public transport.*	Check access to public transport or creation of access to the nodes next to the building up to 1000m; in specific cases, creating and distributing their own public transport mechanisms.
	Space for All	4%	Y	3%	Inclusive built areas	P26	Buildings with accessibility for all, ensuring inclusivity solutions.	Identify all potential localities with accessibility and movement problems and identify the solutions adopted to solve them, both inside homes and abroad.
				1%	Inclusive spaces - Accessible and safe streets and public spaces	P27	Contribute to secure safe and accessible public spaces (common or not).	Ensure that outdoor spaces are safe and accessible, including accessibility for all (inclusive design).
	Social Vitality	4%	Y	2%	Flexibility and complementarity of uses	P28	Ensure that built environments are flexible and can allow or evolve into complementary uses.	List and prove the solutions, and / or measures implemented, their objective, efficiency and effectiveness in order to facilitate the adaptability of the building to other uses. Check for modular and adaptable areas.
				1%	Contribution to community well-being (Health, ..)	P29	*Ensure good health and well-being conditions in common spaces and in the community.*	Identify all the solutions, equipment, activities and measures adopted in order to guarantee the accessibility and interaction of the built space with the community.
				1%	Social responsibility (and vitality)	P30	*Promote interconnection with the community and contribute to socially responsible actions and encourage vitality.*	Promote interconnection with the community and contribute to socially responsible actions and energize vitality.
	Amenities and Culture	3%	Y	2%	Friendly amenities	P31	Contribute or create the conditions to have friendly amenities or guaranteed access to them.	Quantify the natural and human amenities existing in the surroundings of the building or development (radius of 500 and 1000 m). Determine the distance to each of these amenities, according to a route that can be easily walked on foot.
				1%	Contribution to culture and identity	P32	*Value culture and identity (constructive solutions, information, etc.).*	Identify solutions that can value culture and identity (constructive solutions and information).
	Green Economy (and Sustainable)	7%	Y	5%	Low life cycle costs	P33	Developing lower cost solutions in the life cycle (from the initial phase to final).	Check relationship cost /quality of the solutions. Value of costs in the life cycle, including investment and maintenance vs. operation savings.
				1%	Contribution to circular economy	P34	*Contribute or create conditions for the circular economy and endogenous local activities.*	Adopt solutions that reuse waste and other flows not usually used, Foster the local economy.
12 C. / 22 %				1%	Contribution to green jobs	P35	*Contribute or create conditions for greener services and activities and / or local employment.*	Identify all potential sites with social inequalities, and identify tailored solutions for resolution.
22%								Create conditions to generate new jobs in the building itself and / or the existence of jobs in its surroundings (up to 1000m), which can contribute to the integration of the people residing in that building.
Sustainable Use	Connectivity	3%	Y	3%	Connectivity and Interaction (Digital Systems)	P36	Ensure the possibility of digital connectivity, functions and interaction resulting in a safe and appropriate manner.	Identify the possibility of digital connectivity and its functionalities.
	Sustainable Management	5%	Y	3%	Information management for sustainable performance	P37	Develop solutions and information for a more sustainable performance of the user.	Identify all types (in quality and quantity) of information available and delivered to occupants and maintainers, on environmental aspects, equipment operation, building plans, maintenance specifications, monitoring, user manuals, installations, among others.
				1%	Maintenance and management for sustainability	P38	Implement management and maintenance systems for sustainability.	List all existing measures and devices, level of control, coverage and programmability, which allow to control the indoor environment, its objective, efficiency and effectiveness.
								Check and list the existence of some type of environmental monitoring, EMS (or others), certifications and what stage they are in.
5 C. / 11 %				1%	Monitoring and governance	P39	Communicate performance and engage stakeholders in governance for sustainability by interconnecting to monitoring.	Verify and account for the application of measures that allow a good interaction with the community, and that this same community (especially the resident) has influence in the decision making regarding the management of the building.
11%	Marketing and Innovation	3%	Y	3%	Marketing and innovation	P40	Innovate and promote sustainability. Use sustainability to position itself in the market.	List the innovative aspects that were implemented and characterize them, including their effective contribution to the improvement of the environmental performance of the building and the area of incidence.

ıd application in each stage of built environments lifecycle (V4.01a)		Possible Interventions			
	Essencial	Extremely Important	Important	Reduced Importance	Almost Meaningless
RUCTION		**APPLICABILITY FOR EACH PHASE**			
Good practice guidelines	**No.P**	**Plan**	**Project**	**Construction / Renovation**	**Operation**
Ensure air quality, comfort, acoustic levels. Reducing the risk of hazardous chemicals (VOCs, Halogenates, Biocides, Persistent Organic Pollutants (POPs) (DE 107 Matrix Env1.2). Ensure the quality of the construction, plan and measures of control and measurement (bloor door test, thermal image, deburring, index of reduction of noise, other measurements) DE566. Measures to prevent fungi and other problems if relevant. Solutions and performance certificates.	P20				
Application of measures of control and inhibition of crime and vandalism in two distinct but complementary aspects: building and adjacent public space, and measures at the level of public space are the most preponderant. These measures can be organized in areas related to lighting, surveillance, space permeability and fields of view in that same space.	P21				
Assess risks and modes of adaptation. Adapt to the existing natural risks and avoid the risks inherent to the architectural solutions adopted. The possibility of an involuntary accident should be reduced or zero, so that particular attention should be paid during the planning and construction phase of the building to avoid the construction or application of potentially dangerous elements or are not sufficient to prevent or inhibit the consequences of natural threats. Analysis of disasters and impacts resulting from prevention, preparedness and emergency action.	P22				
Ensure diverse systems that allow to maintain the natural and human service, adjusting to variations, in an evolutionary logic. To value the efficiency factor in the use of space (DE 239).	P23				
Promote low impact mobility solutions that can be implemented. Qualify infrastructures and service.	P24				
Access to public transport or creation of access to this node, in specific cases creation of own public transport mechanisms and distance to them. Qualify infrastructures, modes of transport and assured service.	P25				
Reducing sites with potential problems of accessibility and movement and identifying the inclusive solutions adopted with a view to their resolution. Reduce existing barriers.	P26				
Development of safe and accessible public spaces.	P27				
Foster the flexibility of spaces, namely through the availability of accessibility, modular areas, adaptable and expandable to various uses. Complementarity of uses.	P28				
Conditions of creation of active welfare. Credits that allow the integration and accessibility of the community to the development: make it possible for non-residents of the building to enjoy the natural outdoor spaces of leisure and / or sport, destined to any age group. In certain situations, the use of interior areas of the building that can be accessed by the community (eg interior areas of restoration associated with public outdoor spaces), areas of community interaction are also privileged.	P29				
Promote interconnection to the community. Contribution to community (Place with positive image for community, or with municipal impact, ...). Possibility of generating synergies; Dynamic mechanisms of social vitality.	P30				
Take advantage of the proximity of amenities (or contribute to your access and if possible for your development). To quantify the natural and human amenities existing in the surroundings of the neighborhood (radius from 500m to 1000m). Determine the distance to each of these amenities, according to a route that can be easily walked on foot.	P31				
Valuing culture and identity.	P32				
Promote a good relation between cost/quality of materials, equipments, systems, existing elements in the building	P33				
Contribute to circular economy and local activities.	P34				
Create conditions to empower and encourage local economic activities. Reducing social inequalities at the local level by identifying and adapting solutions for their resolution. Encourage the establishment of economic activities relevant to the development of the area.	P35				
Connectivity and Interaction (Digital Systems)	P36				
Survey and quantification of the information regarding the mode of operation and management of the building that are made available to the occupants of the building and responsible for the maintenance. This information shall include data on environmental aspects, equipment operation, maintenance specifications, general building data and construction data. Possibility of having a sustainability guide, information system and technical manual.	P37				
Environmental management systems, or management modes, including comfort controllability in 5 large areas: Temperature, Humidity, Ventilation, Shading and Illumination. Solutions should be sought that can cover all these areas and promote interaction between them, resulting in improved performance of the built environment and greater effectiveness in achieving adequate comfort levels for users. Accessibility in the cleaning of exterior areas (glazing, roofing, drainage systems and other areas). BIM integration. Existence of management system or manual for the manager (facility manager - FM). FM programs; Infrastructure services: General cleaning; cleaning of glass, facades, gardens, reception, security;	P38				
Adopt monitoring systems. Create conditions and implement measures allowing a good interaction with the community, and that this same community (including the resident) have influence in decision-making regarding the management of the building. Or even information to the public about performance.	P39				
Systematize and analyze structural or timely innovations that have an effective and effective contribution to one or more evaluation criteria, contributing effectively to the improvement of the environmental performance of the building, with the possibility of affecting the area of incidence. Integrate sustainability into the different phases (planning, design, operation and even deconstruction). Evaluation of the life cycle integrated in the solution decision process.	P40				

how to obtain further information?

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