CESBA NEIGHBORHOOD AWARD 2019

Guideline for Key Performance Indicators (KPI) calculation

This document provides a guideline for calculating the KPI for assessing the neighborhood. 8 KPI's are described below. 7 KPI´s are compulsory to calculate.

Please use the submission template to fill in the results.

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Cooperation agreements have been made with the following organisations:
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Content

1 Ecological value of land

(Reference CESBA SN-Tool: A 1.7 Conservation of Land)

1.1 Intent

To determine the proportion of land, considered to be of value for ecological or agricultural purposes that remains undeveloped.

1.2 Assessment methodology

1.2.1 Description

Most urban areas exist in a state of continuing development and re-development, with the building stock and infrastructure undergoing concurrent construction, operation, renovation and demolition activities. In many cases development or re-development is inefficient in terms of the use of land that would otherwise be valuable for ecological or agricultural purpose. In this context, the amount of such land that remains undeveloped is useful information in developing strategies to ensure efficient urban development, while ensuring the integrity of ecological and agricultural services.

1.2.2 Data requirement

Indicator	Unit	Data source
Area of undeveloped land with ecological or agricultural value / area of the neighborhood	%	Urban area thematic map

1.2.3 Assessment method

To characterize the indicator's value:

1. Determine the area of the neighborhood
2. Determine the undeveloped area of land that is considered by authorities to be of ecological and agricultural value
3. Calculate the ratio between the undeveloped area and the area of the neighborhood

Specifications:

- Only areas with recognized ecological or agricultural value, also in case of reconverted areas, must be taken in account.
- The area of the neighborhood is the area included within the perimeter selection.
- Parks and squares are not considered undeveloped land.
- Definition of agricultural value: an area that is intended for agricultural objectives (food, forage, etc.) Definition of ecological value: an area that has an ecological value because it provides support to native life forms, making up natural ecosystems.

2 Use stage energy cost for public buildings

(Reference CESBA SN-Tool: B3.3 Use stage energy cost for public buildings)

2.1 Intent

To assess the cost of energy services for public buildings.

2.2 Assessment methodology

2.2.1 Description

The annual operating energy costs are usually a significant part of total operating costs. This criterion provides information on the actual energy costs of public buildings in the urban area.

2.2.2 Data requirement

Indicator	Unit	Data source
Aggregated annual operating energy cost per aggregated indoor useful floor area	Euro/m^2/year	Estimation or energy bills

2.2.3 Assessment method

To characterize the indicator's value:

1. For each building in the urban area, calculate the annual operating energy (thermal and electric) cost (euro/year).
2. Sum the operating energy costs of each building in the urban area up to an aggregated annual operating energy cost value (euro/year).
3. Sum the indoor useful area of each building in the area up to an aggregated indoor useful area value (m^2).
4. Calculate the indicator as: aggregated annual operating energy cost / aggregated indoor useful area (euro/ m^2/year).

Note:
The public buildings that must be considered in the calculation are offices and schools (all degree levels, excluding universities).
The operating energy cost is the utility costs associated with occupation of a building, inclusive of communal costs of operating a building and the costs associated with occupier energy use. The operating energy is the one metered by the utilities.
It is the energy per 'carrier' (e.g. thermal or electrical energy) supplied to the building, to satisfy end uses within the building (heating, cooling, ventilation, domestic hot water, lighting, appliances, etc.).
In the calculation it is possible to use real or estimated costs. Their percentage on the total costs must be declared in the way to understand the reliability of the result. If both the real energy costs and the estimated one is available, the first one should be used.
The real energy cost is suitable for the indicator's calculation only if the building has been constructed and is occupied for at least 1 year prior to the analysis and preferably has been in use for 3-years, in order to ensure that there has been time enough to have building systems reach their normal operating efficiency levels, and also to factor out unusual seasonal variations. This means that the buildings assessed are at least 3 years old.

3 Share of renewable energy on total final thermal energy consumption

(Reference CESBA SN-Tool: C.2.1 Share of renewable energy on-site, relative to total final thermal energy consumptions for buildings operation)

3.1 Intent

To incentive the consumption and production of renewable energy.

3.2 Assessment methodology

3.2.1 Description

The criterion assesses the share of renewable thermal energy in final thermal energy consumption and, by implication, the degree to which renewable fuels have substituted fossil and/or nuclear fuels and therefore contributed to the decarbonization of the Mediterranean area economy. It also shows what is the progress towards Europe 2020 target for renewable energies.

3.2.2 Data requirement

Indicator	Unit	Data source
Annual total thermal energy consumption from on-site renewable energy sources / annual total final thermal energy consumption	%	Metered or estimated data

3.2.3 Assessment method

To characterize the indicator's value there are two options:

- Use of estimated data
  or
- Use of metered data

Note:
For the evaluation of the actual performance of the urban area it is preferable to use metered data. If metered data aren't available, estimated data shall be used.
Estimated data are used for evaluating retrofit scenarios in planning and decision-making processes.
In reporting the indicators value, data sources must always be indicated.

Exported energy is the one delivered by technical systems through the system boundary (urban area) and used outside the system boundary. Exported energy is a benefit beyond the system boundary and it has not to be included in the calculation.

Use of estimated data:

1. In the calculation of the final energy consumption, the following energy uses must be considered: heating, cooling, domestic hot water.
2. For each building in the local area, calculate the annual final thermal energy consumption in kilowatt hours (kWh/year)

3. Sum the annual final thermal energy consumption of each building up to aggregated annual total annual final thermal energy consumption (kWh/year).
4. For each building in the local area, calculate the annual final thermal energy consumption from on-site renewable energy sources in kilowatt hours (kWh/year)
5. Sum the annual final thermal energy consumption from on-site renewable energy sources of each building up to aggregated total annual final thermal energy consumption from on-site renewable energy source (kWh/year).
6. Calculate the indicator as: annual total final thermal energy consumption from on-site renewable energy sources / annual total final thermal energy consumption.

Note:
Calculations are based on EN 13790 using the quasi-steady state monthly method

Use of metered data:

1. In the evaluation of the final thermal energy consumption, the following energy uses must be considered: heating, cooling, domestic hot water.
2. For each building in the local area, collect the metered annual final thermal energy consumption) in kilowatt hours (kWh/year).
3. Sum the annual final thermal energy consumption of each building up to an aggregated total annual final thermal energy consumption (kWh/year).
4. For each building in the local area, collect the monitored annual final thermal energy consumption from on-site renewable sources in kilowatt hours (kWh).
5. Sum the annual final thermal energy consumption from on-site renewable sources of each building up to an aggregated total annual final thermal energy consumption from on-site renewable sources (kWh/year).
6. Calculate the indicator as: annual total thermal energy generation from on-site renewable energy sources / annual total final thermal energy consumption.

Note:
The metered energy consumption is suitable for the indicators calculation only if the building has been in use for 3-years, in order to ensure that there has been time enough to have building systems reach their normal operating efficiency levels, and also to factor out unusual seasonal variations. This means that the buildings assessed are at least 3 years old.

According with the Directive 2009/28/EC (RES Directive), energy from renewable sources means energy from renewable non-fossil sources, namely wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases.
Heat pumps enabling the use of aerothermal, geothermal or hydrothermal heat at a useful temperature level need electricity or other auxiliary energy to function. The energy used to drive heat pumps should therefore be deducted from the total usable heat. Only heat pumps for which SPF > 1,15 * 1/ η shall be taken into account.

3.3 Reference and standards

EN 13790 (Energy performance of buildings. Calculation of energy use for space heating and cooling).
Directive 2009/28/EC (RES Directive).
2013/114/EU: Commission Decision of 1 March 2013.

4 Total GHG Emissions from energy used

(Reference CESBA SN-Tool: D1.2 Total GHG Emissions from primary energy used in building operations)

4.1 Intent

To minimize the total greenhouse gas emissions from buildings operations.

4.2 Assessment methodology

4.2.1 Description

The criterion measures the contribution of the greenhouse gas (GHG) emissions associated with the buildings operational phase on the earth's global warming or climate change. The Global Warming Potential (GWP) was developed to allow for the comparison of the impact on global warming caused by different gases. Specifically, it is a relative measure of how much energy can be trapped in the atmosphere over a set time horizon by a mass of gas in comparison with the same mass of carbon dioxide (CO_2). A higher GWP means a larger warming effect in that period of time.

4.2.2 Data requirement

Indicator	Unit	Data source
CO_2 equivalent emissions per useful internal floor area per year	Kg CO_2 eq./m^2/yr	Estimation

4.2.3 Assessment method

The scope of the indicator comprises the use stage of the building and includes the emissions correlated to the following energy uses: heating, cooling, ventilation, domestic hot water, lighting, auxiliaries.

To characterize the indicator's value:

1. For each building in the area calculate the emissions of CO_2 eq. with the following formula:

$$E = \left[\sum \left(Q_{fuel,i} \times LHV_i \times k_{em,i}\right) + \left(Q_{el} \times k_{em,el}\right) + \left(Q_{dh} \times k_{em,dh}\right)\right]$$

$Q_{fuel,I}$ = annual quantity of i-th fuel (m^3 or Kg)
Q_{el} = annual quantity of electric energy from the grid (kWh)
Q_{dh} = annual quantity of energy from district heating/cooling (kWh)
LHV_i = lower heating value of the i-th fuel (kWh/m3 or kWh/Kg)
$K_{em,i}$ = CO_2 eq. emission factor of the i-th fuel (Kg CO_2/kWh)
$K_{em,i}$ = CO_2 eq. emission factor of the electric energy from the grid (Kg CO_2/kWh)
$K_{em,i}$ = CO_2 eq. emission factor of energy from district heating/cooling (Kg CO_2/kWh)

Calculate the aggregated annual total CO_2 equivalent emissions from all buildings / total useful internal floor area of all buildings

Note:

In the calculation, the annual quantity of fuels, electric energy from the grid, energy from district heating/cooling can be metered or estimated. The source of data must always be clearly declared.

4.3 References and standards

EN 15603 (Energy performance of buildings - Overall energy use and definition of energy ratings)

5 Consumption of water for residential population

(Reference CESBA SN-Tool: E.1.6 Consumption of water for residential population)

5.1 Intent

To make efficient use of water resources

5.2 Assessment methodology

5.2.1 Description

The criterion measures the potable water consumption of sanitary fittings/devices and water consuming appliances by residential population.

5.2.2 Data requirement

Indicator	Unit	Data source
Annual potable water consumption per occupant	m^3 /occupant/year	Metered data

5.2.3 Assessment method

The potable water consumption is calculated based on metered data for water consuming appliances and sanitary fittings in the buildings. The scope of the criterion includes the use of potable water for:

- drinking water;
- water for sanitation;
- domestic hot water;
- water for washing machine;
- water for dishwasher;
- water for cleaning

To characterize the indicator's value:

1. For each residential building collect the monitored annual potable water consumptions for building operation. The consumption data must be estimated taking the average over 3 years period (m^3).
2. Sum the annual potable water consumption of each building up to aggregated annual total potable water consumption (m^3/year)
3. Estimate the number of residential buildings' occupants.
4. Calculate the indicator's value as: aggregated annual total potable water consumption / number of occupants

6 Ambient (outdoor) air quality with respect to particulates

(Reference CESBA SN-Tool: F.2.3 Ambient air quality with respect to particulates <10 mu (PM10) over a one year period)

6.1 Intent

To assess the long-term ambient air quality with respect to particulates <10 mμ (PM10) in the local area.

6.2 Assessment methodology

6.2.1 Description

Particulate matter (PM10) pollution consists of very small liquid and solid particles floating in the air. PM10 is a mixture of materials that can include smoke, soot, dust, salt, acids, and metals. Particulate matter also forms when gases emitted from motor vehicles and industry undergo chemical reactions in the atmosphere. PM10 is among the most harmful of all air pollutants. When inhaled these particles evade the respiratory system's natural defences and lodge deep in the lungs. The criterion allows to evaluate the level of exposition of inhabitants to PM10 in the urban area.

6.2.2 Data requirement

Indicator	Unit	Data source
Number of days exceeding the daily limits in a year	days/year	Estimation / Calculation

6.2.3 Assessment method

To characterize the indicator's value:

1. Daily test air samples in accordance with national or regional procedures over a period of one year;
2. Evaluate the number of days exceeding the daily limits in a year.

7 Quality of pedestrian and bicycle network

(Reference CESBA SN-Tool: G.2.4 Quality of pedestrian and bicycle network)

7.1 Intent

To promote cycling and walking as an alternative to vehicle use by providing a safe and efficient mobility networks. Travelling by bicycle or by foot means less cars on the roads which reduces traffic congestion. Efficient alternative and environmentally-friendly modes of transport are key to not only improve mobility and quality of life as well.

7.2 Assessment methodology

7.2.1 Description

Increasing zero emission mobility is crucial to lower the carbon footprint of human activities.

7.2.2 Data requirement

Information / Attribute	Unit	Data source
Total walkway meters of dedicated pedestrian paths and meters of bicycle path and “shared space” per 100 inhabitants	m / 100 inhabitants	Estimation / Calculation

7.2.3 Assessment method

To characterize the indicator’s value:

1. Estimation of the number of inhabitants in the area
2. Calculation of the walkway meters of dedicated pedestrian paths in the area (A)
3. Calculation of the meters of bicycle paths in the area (B)
4. Calculation of the meters of “shared space” in the area (C)
5. Calculation of the indictor’s value as: $\frac{(A+B+C)}{100\ \text{INHABITANTS}}$

Note:

- Pedestrian paths not part of a “shared space” must be safe to be considered (physically separated from traffic roads)
- Bicycle paths not part of a “shared space” must be safe to be considered (physically separated from traffic roads)
- A “shared space” is an urban design approach that minimizes the segregation between modes of road user (car, pedestrian, bicycle, etc.) in order to make safe space for every type of mobility; the shared space is to be used by anyone. This can be done through minimizing traffic signs, road surface markings, enforcing speed reduction down to 15-20 kmh. Shared space is here understood in a broad definition including the different philosophies and implementation methods in force in Europe. For the calculation it is necessary to evaluate the linear meters of all the streets included in a shared space.

7.3 References and standards

Global Platform for Sustainable Cities – Urban Sustainability Framework.
The pedestrian and the City- Carmen Hass-Klau.

8 Community involvement in urban planning activities

(Reference CESBA SN-Tool: G.6.3 Community involvement in urban planning activities)

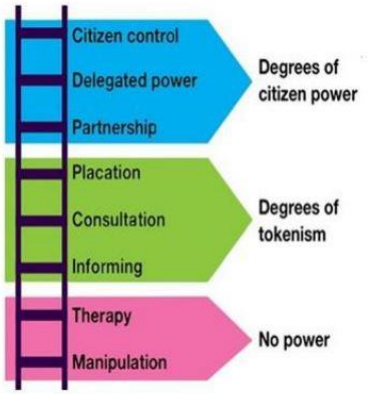
8.1 Intent

To raise the level of community involvement in planning through the redistribution of power. The assessment is therefore about:
- how much citizens (inhabitants and users) are integrated to the planning process?
- how much their opinion is taken into consideration?
- how much they drive the planning agenda?
- Are people “planned for” by external experts or are they part of the decision making process?
- Is there a dichotomy between the planners holding power (and supposedly knowledge) and citizens?

8.2 Assessment methodology

8.2.1 Description

The Arnstein ladder, built by Sherry Arnstein (SA), is the reference for community planning assessment. Her work remains the basis of current research on citizen involvement in planning. The hereby proposed assessment process is therefore based on the SA ladder (figure1) and further development from Hélène Chelzen and Anne Jégou in 20152 which tends to take into consideration recent evolution in practices (figure 2).



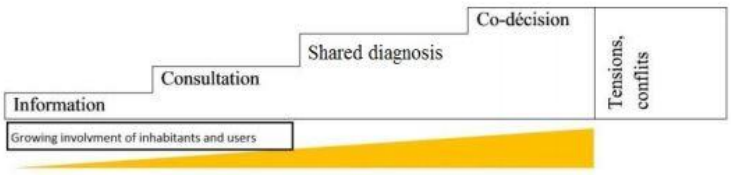


Figure 1 (left): Original Arnstein ladder, with 8 rungs and 3 categories.
Figure 2 (right): Assessing inhabitants involvement, Hélène Chelzen and Anne Jégou , from Arnstein and Beuret.

8.2.2 Data requirement

Indicator	Unit	Data source
Level of involvement of users in urban planning	Level (score)	Process documentation

8.2.3 Assessment method

To characterize the indicator's value:

1. Use of the Sherry Arnstein ladder on citizen participation. Rate the level of users' involvement on planning.

Levels of involvement for assessment:
Level 0: Non participation (manipulation and therapy)
Level 1: Degrees of tokenism (information and consultation)
Level 2: Shared diagnosis (Degrees of citizen power)
Level 3: Co-decision (Degrees of citizen power)
Level 4: Community investment (Degrees of citizens power)

Definitions of the different levels:

The criterion may be applied only during the implementation of a planning process for an area of the city, in which there is the involvement of the community in urban planning activities. A shared diagnosis can be made after delivery for corrective actions to be implemented.
As a supportive introduction to identification of the level of citizen involvement, the method provides the definition of the main rungs from SA ladder and steps from Chelzen and Jegou, classified in the 3 categories: 1/Non participation; 2/Degrees of tokenism ; 3/Degrees of citizen power, including shared diagnosis and co-decision.

Level 0: "Non-participation" or "No power" category including rungs "Manipulation" and "Therapy" (in the Arnstein ladder).

The description of the 2 rungs of the "Non-participation / No power" category i.e "Manipulation" and "Therapy" provided by SA encompasses complete external expertise for realizing the urban project on the neighborhood and a lack of transparency in the program information.

Level 1: "Degrees of tokenism" category including rungs "Information", "Consultation" and "Placation" (in the Arnstein ladder).

In the "Degrees of tokenism" category, the level of information transparency is good, but the redistribution of power is low and involvement remains symbolic. The reason is the goal for the communication.
Here, the goal of "Information" is to explain the project and gain support. There is no option or scenario to discuss upon with citizens. There is very little opportunity for people to influence the program designed by external experts. Information is a one-way flow from project owner/developer to users.
Here, "Consultation" means collecting the opinion of inhabitants and users. Still it is not a guaranty it will be taken into consideration. There is no follow-through assurance. The scope for taking into consideration citizen concerns and ideas is often marginal.
Consultation would only lead to a degree of citizen power if the consultation results are taken into account.

Level 2: "Degrees of citizen power" category including rungs "Partnership", "Delegated power" and "Citizen power" (in the Arnstein ladder) and "Shared diagnosis" and "Co-decision" (from Chelzen and Jégou).

The main point of this category is the recognition of inhabitants and users expertise, and its integration within the project.
Here "Partnership" refers to redistribution of power, shared between citizens and power holders in planning and decision-making responsibilities. This can be done notably in the diagnosis phases, upstream of the project definition or after the delivery.

A shared diagnosis (or shared state of the art) consists in understanding spatial practices on the urban territory and pointing out dysfunctions based on users' experience and expertise. In this approach, users do not have decision power, but they are recognised/admitted as indispensable in the development of the diagnosis.
This means they are more likely to influence the agenda pointing out their needs and concerns. In the planning process, the shared diagnosis can happen upstream to be the base of the project.
It can also be made once the project is completed to assess the results and to consider corrective action consequently.

It leads to "Co-decision", if users are then involved in the co-construction and/or choice of planning scenario based on this shared diagnosis.

Level 3: The recognition of user's expertise as well as its central place in the project leads to "Co-decision", if users are then involved in the co- construction and/or choice of planning scenario based on this shared diagnosis. It can also lead to the management of facilities by the community (eg : the community is taking care of some shared gardens…) in the life time of the project.

Level 4: Community investment is another way of taking part to the decision making process and support the neighborhood project. Inhabitants take part to the decision also participating to the finance of some investments. This can lead to the development of local cooperative (eg a solar power plant is set up on the basis of co-ownership through a cooperative. As shareholder in the project, the community takes decision on the project and the way it should be carried out).

Assessing levels of involvement:
The following table aims at supporting the assessment of the different levels.

Issue	What to highlight	Data source (indicative)
Information	Number and variety of information media (panels on site, documents including all studies, programs and calendar on website, dedicated communication materials leaflets, articles in the city magazine, information meetings, a project house with models of the planned project…)	Documents Weblinks Pictures
Information and consultation	Scheduling of public meetings including duration, number and dates. (does the scheduling allow the attendance of the many? when is it planned : day	Schedule of the information and concertation meetings

	or evening or both? Working time or holydays or both ? Where : known community location, changing location?	
Consultation (about the project program) to co-decision	How is it done (pubic registry, survey)? When is it done? (this should highlight the potential for integrating people's suggestion)? Are the results shared?	Consultancy contract Survey if applicable
Shared diagnosis	Process for shared diagnosis, Existing dedicated consultancy, Survey done to users, Workshops to build and confirm the diagnosis collectively	Consultancy contract, Workshop minutes, Pictures, Final diagnosis
Co-decision	Process for co-decision Existing dedicated consultancy? Workshops? Existing scenarios presented to users? Evolution of scenario to integrate citizens feedback	Consultancy contract Workshops minutes, Pictures, Ground plans
Community investment	Process for fund leverage (from private society funds to cooperative). Management process of the considered investment. Level of community finance in the total.	Financing plan Status of the organization managing the facility (eg : local cooperative status)

8.3 References and standards

Arnstein S., 1969, "A Ladder Of Citizen Participation", Journal of the American Institute of Planners 35 (4), p. 216-24.

Chelzen Hélène and Jégou Anne, « À la recherche de l'habitant dans les dispositifs participatifs de projets urbains durables en région parisienne : les éclairages de l'observation participante », Développement durable et territoires [En ligne], Vol. 6, n°2 | Septembre 2015, mis en ligne le 30 septembre 2015.

Quartiers Durables Méditerranéens (Sustainable Mediterranean Neighbourhood), an approach towards sustainable Mediterranean neighbourhoods in the Provence-Alpes-Côté d'Azur Region, envirobatBDM.