Istanbul Environment Friendly City Award

Quantitative Indicators Assessment Guide

(Calculation Guidelines)

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A - Nature and Biodiversity Protection
A.1 Climate Change

Criterion	A1.1 Greenhouse gas emissions reduction
Type	Mandatory
Indicator	Total amount of greenhouse gases in tons (equivalent carbon dioxide units) generated over a calendar year divided by the current city population
Unit of measure	Tons CO2 eq. / inhabitant

Assessment method

The greenhouse gas emissions shall be calculated for key macro-sectors where local authorities can influence energy consumption and consequently reduce related CO_2 emissions.
The key macro-sector to take in account are:
- Buildings and public lighting
- Transport

The sectors included in "Buildings and public lighting" are:
- Municipal buildings (buildings owned by the local authority).
- Tertiary (non-municipal) buildings (buildings and facilities of the tertiary sector, for example offices of private companies, banks, commercial and retail activities, hospitals, etc).
- Residential buildings (buildings that are primarily used as residential buildings. Social housing is included in this sector).
- Public lighting (public lighting owned or operated by the local authority - e.g. street lighting and traffic lights).

The sectors included in "Transport" are:
- Municipal fleet (Vehicles owned and used by the local authority's administration).
- Public transport (Bus, tramway, metro, urban rail transportation and local ferries used for passenger transport).
- Private and commercial transport (Road, rail and boat transport in the territory of the local authority which refer to the transport of persons and goods not specified above (e.g. private passenger cars and freight transport).

To calculate the indicator's value;
1. Over a calendar year, calculate the final energy consumptions per energy carrier (e.g. electricity, natural gas, etc.) used in the different sectors (e.g. residential buildings, public transport, etc.) within the territory of the local authority
2. Calculate the CO_2 emissions for each energy carrier by multiplying the final energy consumption by the corresponding emission factor. IPCC (Intergovernmental Panel on Climate Change) emission factors can be used.
3. Sum all the CO_2 emissions calculated in the previous step.
4. Divide the total CO2 emissions calculated in the previous step by the current city population

If the data for a specific sector aren't available, the indicator can be still calculated. The missing information shall be declared in the application form.

Useful tool: https://emissionfactors.com/knowledge/questions/26/criteria-for-choosing-the-best-emission-factor/

A.3 Sustainable-use of resources

Criterion	A3.1 Efficiency in water use
Type	Mandatory
Indicator	Volume of water supplied minus the volume of utilized water divided by the total volume of water supplied.
Unit of measure	%

Assessment method

Part of the water supplied in a city could be lost before reaching the users because of leakages that are usually due to old and deteriorating water reticulation systems.

Calculation steps:
- Calculate the total volume of water supplied in the city (A) - denominator
- Calculate the volume of utilized water (B) - numerator
- Calculate the value of the indicator as B/A x 100 (%)

B - Built Environment

B.1 Resilient coast

Criterion	B1.2 Setback zone
Type	Recommended
Indicator	Area of built-up land in the setback zone/total area of 100m setback zone
Unit of measure	%

Assessment method

Coastal setback marks the width of the strip from the coastline in which construction is not allowed. The concept of and the obligation to apply the coastal setback are defined by the Protocol on Integrated Coastal Zone Management (ICZM) in the Mediterranean which was adopted in 2008, entered into force in 2011. The reasons for prescribing the setback and the general principles of the Protocol are defined especially by the articles 5 and 6, and include:
1. Avoiding risks facing the coastal zone, especially avoiding damage that could occur due to natural processes such as erosion, natural catastrophes and climate change
2. Preservation of natural and landscape values of the coast and the natural dynamics relevant to those values;
3. Securing free access to the sea and the coast which, depending on the local conditions, includes enabling acceptable forms of recreational use.

In the context of sea-level rise this measure belongs to the group of the so called low-regret measures, i.e. measures that cause little harm to the society and could potentially bring great benefits. The little harm regards primarily the owners of private land who, by the establishment of the setback, lose the possibility of short-term profit. However, in the long term those developers are also protected by this measure against the costs and damage due to flooding by the sea.

Calculation steps:
- Calculate the area of the setback zone (A) - denominator
- Calculate the area of build-up land in the setback zone (B) - numerator
- Calculate the value of the indicator as B/A x 100 (%)

Note:
- For the purpose of analyzing setback zone built-up land comprises only the land covered with permanent structures, including land covered with transport infrastructure i.e. land on which buildings or transport infrastructure is present.

B.2 Sustainable land use

Criterion	B2.1 Urban compactness
Type	Mandatory
Indicator	Built-up land area per inhabitant
Unit of measure	m^2/inhabitant

Assessment method

In compact cities connections are more efficient because of a greater proximity. Car dependency, energy consumptions and carbon emissions are reduced. Public transport is more efficient. In the same time a compact city reduces the consumption of areas with ecologic and agricultural value.

Calculation steps:
- Calculate the aggregate built-up land in the city, in m^2 (A) - numerator
- Determine the city's inhabitants' number - denominator
- Calculate the value of the indicator as A/B (m^2/inhabitant)

Note:
- Built-up land comprises residential land, industrial land, commercial land, land used by public services, land of mixed use, land used for transport and communications, for technical infrastructure, recreational land (source EUROSTAT). i.e. any land on which buildings and/or nonbuilding structures are present.

Criterion	B2.2 Conservation of land
Type	Recommended
Indicator	Area of undeveloped land with ecological or agricultural value / area of the city.
Unit of measure	%

Assessment method

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.

Calculation steps:
- Calculate the area of the city (A) - denominator
- Calculate the undeveloped area of land that is considered by authorities to be of ecological and agricultural value (B) - numerator
- Calculate the value of the indicator as A/B x 100 (%)

Note:
- Only areas with recognized ecological or agricultural value, also in case of reconverted areas, must be taken in account.
- 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 provides support to native life forms, making up natural ecosystems.

Criterion	B2.3 Permeability of land
Type	Recommended
Indicator	Area of permeable surfaces on total city area.
Unit of measure	%

Assessment method

Permeability of land is the capacity to transmit water to the soil. It is a very important issue connected to the water recharging of aquifers and the reduction of effluents. Soil sealing - the covering of the ground by an impermeable material – is one of the main causes of soil degradation. Soil sealing often affects increases the risk of flooding and water scarcity and contributes to global warming.

Calculation steps:
- Calculate the size (S_a) of the city area (m^2)
- Calculate the size of the surfaces with a different paving or occupied by constructions in the city area (i.e. green areas, surfaces paved with asphalt, surfaces occupied by buildings, etc.). Include all the surfaces in the city area so that:

$$S_a = \sum_{i=1}^{n} S_{a,1}$$

S_a = total surface of the city area
$S_{a,i}$ = surface i-th in the city area (m^2)

- Calculate the real permeability of soil considering the permeability coefficient of each surface.

$$S_{a,perm} = \sum_{i=1}^{n} (S_{a,i} \times \alpha_i)$$

$S_{a,i}$ = i-th surface in the city area (m^2)
α_i = permeability coefficient of the i-th surface

- Calculate the indicator's value as: $\frac{S_{a,perm}}{Sa} \times 100$

Note:

- Reference permeability coefficients:
- Grass = 1
- Gravel = 0,9
- Sand = 0,9
- Plastic gratings filled with land/grass = 0,8
- Concrete gratings leaning on the grass = 0,6
- Concrete gratings leaning on gravel = 0,6
- Interlocking elements leaning on sand = 0,3
- Interlocking elements leaning on gravel = 0,3
- Interlocking elements leaning on concrete pavement = 0
- Continuous pavements leaning on concrete = 0
- Asphalt = 0

B.3 Local transport

Criterion	B3.1 Availability of [high capacity] public transport systems
Type	Mandatory
Indicator	Sum of the kilometers of public transport systems (including high capacity) operating within the city divided by one 100,000th of the city's total population.
Unit of measure	Km/100.000 inhabitants

Assessment method

A city transportation network plays a major role in satisfying people's need for mobility and can provide awareness about traffic congestion and transportation system flexibility.
Examining the city area as a territory system, allows to emphasize the role of a transport infrastructures for defining the territory relational functions, social and economic links among activities.

Calculation steps:
- Calculate one 100.000th of the city's total population (A) - denominator
- Calculate the kilometers of public transport systems (including separately high capacity) operating within the city area (B (and B – HC] - numerator
- Calculate the value of the indicator as B/A, expressed as the kilometers of public transport system and of high capacity public transport system per 100 000 population.

Note:

- High capacity public transport may include heavy rail metro, subway systems and commuter rail system.

Criterion	B3.2 Number of personal automobiles per capita
Type	Recommended
Indicator	Total number of registered personal automobiles in a city divided by the total city population.
Unit of measure	n/inhabitant

Assessment method

The reduction of private vehicle use brings to a better quality of air and to a reduction of greenhouse gases emission. This result is generally only achieved when other transport options are good. Education and information also play a key role to change the behavior of citizens. The number of personal automobiles per capita provides an information about the need for further transport facilities.

Calculation steps:
- Calculate the total city population (A) - denominator
- Calculate the total number of registered personal automobiles in the city (B) - numerator
- Calculate the value of the indicator as A/B (n/inhabitant)

Note:

- The total number of registered personal automobiles shall include automobiles used for personal use by commercial enterprises. This number shall not include automobiles, trucks and vans that are used for the delivery.

Criterion	B3.3 Extent and connectivity of bicycle paths
Type	Recommended
Indicator	Aggregate length of bicycle paths in the city per 100.000 residents.
Unit of measure	Km/100.000 inhabitants

Assessment method

The purpose of this criterion is to encourage the use of bicycles as an alternative to the private car. This would lead to a decrease in congestion levels of roads, as well as a reduction in pollution, with a significant improvement in air quality. The availability of a quality network of bicycle paths in the city, in terms of extension and connectivity, is a key element to promote the use of bicycles as alternative mode of transport.

Calculation steps:
- Calculate the total city population (A) - denominator
- Calculate the linear kilometers of safe cycle tracks in the city (B) - numerator
- Calculate the value of the indicator as B/A (Km/100.000 inhabitant)

Note:

- The criterion considers only the linear meters of safe cycle path, that is a protected path, exclusively reserved to bicycles or shared with pedestrians (pedestrian and cycle path), marked by special signs which indicate it, as well as strips that surround along its way.
- This criterion evaluates, without distinctions, cycle paths on reserved lane and the shared with pedestrians one. In additional are also counted cycle paths in the green areas.

B.4 Pollution and waste

Criterion	B4.1 Municipal solid waste collection
Type	Mandatory
Indicator	Total municipal solid waste produced in the municipality per person.
Unit of measure	Tons/inhabitant

Assessment method

This indicator provides information about the amount of waste a city is producing. This aspect is strictly connected with the environmental problems related to the production of waste and the management of the solid waste in a city. This last aspect is fundamental because contributes significantly to public health.

Calculation steps:
- Calculate the total amount of solid waste (household and commercial) generated in tons (A) - numerator
- Calculate the total city population (B) - denominator
- Calculate the value of the indicator as A/B, as total municipal solid waste collected per capita in tons

Note:
Municipal waste shall refer to waste collected by or on behalf of municipalities.
Municipal waste should include waste originating from:
- households;
- commerce and trade, small businesses, office buildings and institutions (e.g. schools, hospitals, government buildings).

The definition should also include:
- bulky waste (e.g. white goods, old furniture, mattresses);
- garden waste, leaves, grass clippings, street sweepings, the content of litter containers, and market cleansing waste, if managed as waste;
- waste from selected municipal services, i.e. waste from park and garden maintenance, waste from street cleaning services (e.g. street sweepings, the content of litter containers, market cleansing waste), if managed as waste.

The definition shall exclude:
- waste from municipal sewage network and treatment;
- municipal construction and demolition waste.

Criterion	B4.2 Solid Waste Recycling
Type	Recommended
Indicator	Total amount of the city's solid waste that is recycled in tons divided by the total amount of solid waste produced in the city in tons.
Unit of measure	%

Assessment method

Recycling is the recovery and reuse of materials from wastes. Solid waste recycling refers to the reuse of manufactured goods from which resources can be recovered and reused. Important component of the city environmental management are the methods of disposal of solid waste and the levels of collection. An efficient collection, management and recycling of urban solid waste is an important strategy that can yield multiple improvements in both environment preservation and health.

Calculation steps:
- Calculate the total amount of the city's solid waste that is recycled in tons (A) - numerator
- Calculate the total amount of solid waste produced in the city in tons (B) - denominator
- Calculate the value of the indicator as A/B x 100 (%)

Note:

- Recycled materials shall denote those materials diverted from the waste stream, recovered, and processed into new products following local government permits and regulations.
- Hazardous waste that is produced in the city and is recycled shall be reported.

Criterion	B4.3 Water treatment
Type	Mandatory
Indicator	Total amount of the city's wastewater that has undergone a primary treatment divided by the total amount of wastewater produced in the city and collected.
Unit of measure	%

Assessment method

Wastewater treatment is a process used to remove contaminants and convert wastewater into an effluent that can be returned to the water cycle with minimum impact on the environment. The wastewater treatment system is a major indicator of the level of local development and of community health.

Calculation steps:
- Calculate the total amount of the city's wastewater that has undergone primary treatment (A) - numerator
- Calculate the total amount of wastewater produced in the city and collected (B) - denominator
- Calculate the value of the indicator as A/B x 100 (%)

Note:

- Primary wastewater treatment shall refer to the physical separation of suspended solids from the wastewater flow using primary clarifiers.
- Some cities have no system for treating wastewater, this shall be reported.

Criterion	B4.4 Fine particulate matter (PM2.5) concentration
Type	Recommended
Indicator	Annual mean concentration of PM2,5
Unit of measure	mg/m3

Assessment method

PM2.5 describes fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller. Fine particulate matter can cause major health problems in cities, predominantly to the respiratory and cardiovascular systems and to control the level of these fine particles, air quality monitors measure concentrations of PM throughout the city. Major sources of PM2.5 particulates include wood combustion, gasoline-powered motor vehicle and diesel exhaust and road dust.

Calculation steps:
- Collect and calculate the mean PM2,5 concentration value measured over one year by each monitoring station installed in the city
- Calculate the indicator as mean of the values calculated in the previous step (mg/m3)

Criterion	B4.5 Particulate matter (PM10) concentration
Type	Recommended
Indicator	Annual mean concentration of PM10
Unit of measure	mg/m^3

Assessment method

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 defenses and lodge deep in the lungs. The criterion allows to evaluate the level of exposition of inhabitants to PM10 in the city area.

Calculation steps:
- Collect and calculate the mean PM10 concentration value measured over one year by each monitoring station installed in the city
- Calculate the indicator as mean of the values calculated in the previous step (mg/m^3)

Criterion	B4.6 Industrial solid waste reduction
Type	Recommended
Indicator	Annual industrial solid waste reduction by the manufacturing industry.
Unit of measure	Tons/year

Assessment method

This indicator provides information about the resource efficiency of the high-impact manufacturing companies operating in the city. This aspect is important to assess how the city is managing the pollution that is stemming from industrial activities. If not well assessed and managed in collaboration with the national government, waste from industrial sites can threaten the public health. Furthermore, waste producing industries are less competitive, especially if they are export agents.

Calculation steps:
- Calculate the total amount of solid waste generated in tons in selected high impact industry sectors

Industrial waste includes waste originating from:
- High impact manufacturing sector (including cement, construction, agro-food, textiles);
- Industrial zones

This indicator assesses the impact achieved via support given to the **private s**ector-focused projects on pollution prevention and Circular Economy based waste management. Waste reduction can be achieved by **upgrading recycling equipment**, **incre**asing the use of waste for fuel, improved packaging design, **the exchange of reusabl**e by-products between companies. These results can be achieved by municipal programmes providing technical assistance to identify /assess /enhance investments in waste minimisation and material reuse. innovative schemes which tackle entrenched barriers such as limited access to finance for SMEs operating in the sector and grants which facilitate the adoption of best available technologies. Policy dialogue and communication campaigns related to the promotion of a circular economy can also lead to such results.

B.5 Water

Criterion	B5.1 Total water consumption
Type	Mandatory
Indicator	Total amount of the city's water consumption in liters per day divided by the total city population.
Unit of measure	liters/day/person

Assessment method

The consumption of water depends from different aspects like for example the climate, the price of water, the typology of users of a city, for these reasons water consumption is not constant and in general is higher in cities of higher income. More generally, the improvements of water supply systems can ensure a sustainable water consumption in line with water resources.

Calculation steps:
- Calculate the total amount of the city's water consumption in liters per day (A) - numerator
- Calculate the total city population (B) - denominator
- Calculate the value of the indicator as A/B (liters/days)

B.6 Energy

Criterion	B6.1 Thermal energy consumed by residential buildings
Type	Recommended
Indicator	Total final thermal energy consumption for residential buildings operations in kilowatt hours divided by the total population of the city
Unit of measure	kWh/inhabitant/year
Actual value of the indicator (2018)	(value) kWh/inhabitant/year
Estimated value of the indicator in 2013	(value) kWh/inhabitant/year
Target value of the indicator for 2023	(value) kWh/inhabitant/year

Assessment method

The total final thermal energy consumption represents the overall consumption of residential buildings for heating, cooling and domestic hot water. This information is useful to improve the management of thermal energy generation, consumption, and conservation. The indicator gives an information about the energy performance of the city's building stock.

Calculation steps:
- From energy providers, collect the final thermal energy consumption of residential buildings per energy carrier (i.e. gas, oil, biomass, etc.) in kilowatt hours
- Calculate the total final thermal energy consumption adding up all the consumptions per energy carrier
- Collect the total population of the city
- Calculate the indicator dividing total final thermal energy consumption for residential building operations by the total population of the city

Note:
- In the calculation of the final thermal energy consumption, the following energy uses must be considered: heating, cooling, domestic hot water. If a consumption data concerning one or more uses isn't available, it must be declared in the application form.

Criterion	B6.2 Electrical energy consumed by residential buildings	
Type	Mandatory	
Indicator	Total final electric energy consumption for residential buildings operations in kilowatt hours divided by the total population of the city	
Unit of measure	kWh/inhabitant/year	
Actual value of the indicator (2018)	(value)	kWh/inhabitant/year
Estimated value of the indicator in 2013	(value)	kWh/inhabitant/year
Target value of the indicator for 2023	(value)	kWh/inhabitant/year

Assessment method

The total final electrical energy consumption represents the overall consumption of residential buildings. This information is useful to improve the management of electricity generation, consumption, and conservation.

Calculation steps:
- Collect the final electric energy consumption data of residential buildings from electricity providers in kilowatt hours
- Collect the total population of the city
- Calculate the indicator dividing total final electric energy consumption for residential buildings operation in kilowatt hours by the total population of the city

Criterion	B6.3 Share of renewable energy relative to city's total electric energy consumption	
Type	Recommended	
Indicator	Total consumption of electricity generated from renewable sources divided by city's total electric energy consumption	
Unit of measure	%	
Actual value of the indicator (2018)	(value)	%
Estimated value of the indicator in 2013	(value)	%
Target value of the indicator for 2023	(value)	%

Assessment method

The use of renewable energy sources is a main priority for sustainable development, for reasons such as the minimization of greenhouse gas emissions, security and diversification of energy supply, environmental protection.

Renewable sources shall include:
- Non-combustible renewables: geothermal, solar, wind, hydro, tide and wave energy
- Combustible renewables and waste: biomass (fuelwood, vegetal waste, ethanol), municipal waste (waste collected by local authorities for disposal in a central location to produce heat and/or power) and industrial waste

Calculation steps:
- Collect the city's total electric energy consumption data from electricity providers. Usually the consumption data are organized in three categories: residential, commercial and industrial (A) - denominator
- Collect the electric energy production by renewable sources from local utility provider, city energy or environment office (B) – numerator
- Calculate the value of the indicator as A/B x 100 (%)

B.7 Green settlements, building materials and technological systems

Criterion	B7.1 Green urban areas
Type	Recommended
Indicator	Proportion of all vegetated areas within the city boundaries in relation to the total area
Unit of measure	%

Assessment method

The amount of green areas in the city is a relevant aspect to be considered because performs an important role in improving quality of life by mitigating the urban heat island effect and capturing atmospheric pollutants.

Calculation steps:
- Calculate the amount of vegetated areas (in hectares) in the city (A) - numerator
- Calculate the total area of the city (B) - denominator
- Calculate the value of the indicator as A/B (%)

Criterion	B7.2 Green areas in relation to the city population
Type	Mandatory
Indicator	Total area of green in the city divided by one 100.000th of the city's total population.
Unit of measure	h/100.000 inhabitants

Assessment method

A livable city has a good proportion of green areas with respect to its population.

Green areas in cities provides many advantages for citizens as a space for sport and recreation and the preservation of natural environments. Green areas can improve the urban environment helping regulate air quality and climate. recharging groundwater supplies and protecting lakes and streams from polluted runoff.

Calculation steps:
- Calculate the total area (in hectares) of green in the city (A) - numerator
- Calculate the one 100 000th of the city's total population (B) - denominator
- Calculate the value of the indicator as A/B (h/100.000 inhabitants)

Criterion	B7.3 Green roofs
Type	Recommended
Indicator	Aggregate area of building roofs covered with vegetated material divided by the total city's roofs area.
Unit of measure	%

Assessment method

A green roof is a roof of a building that is covered with vegetation and a growing medium, planted over a waterproofing membrane. A green roof contributes to minimize the heat island effect in a city and to improve the water absorption.

Calculation steps:
- Calculate the aggregated area of building roofs in the city (A) - denominator
- Calculate the aggregated area of building roofs covered with vegetal material (B) - numerator
- Calculate the value of the indicator as B/A x 100 (%)

C - Social, Economic and Cultural Sustainability
C.4 Labour force

Criterion	C4.1 City's unemployment rate
Type	Mandatory
Indicator	Number of working-age city residents who are not in paid employment or self-employment, but available for work, and seeking work divided by the total labour force.
Unit of measure	%

Assessment method

This city's unemployment rate is one of the most significative indicators showing the general performance of the labour market and the condition of the economy. Unemployed persons are individuals without work, actively seeking work and at present available for work. Individuals who are not looking for work but have a perspective of a future job start are considered as unemployed. Individuals that are not actively seeking work (through job searches, meetings, interviews, etc.) are not take into consideration as unemployed or as part of the labour force.
Labour force consists of the sum of all the individuals employed and unemployed, who are able to work.

Calculation steps:
- Calculate the number of the total labour force (A) – denominator
- Calculate the number of working-age city residents who during the survey reference period were unemployed (B) – numerator
- Calculate the value of the indicator as B/A x 100 (%)

Criterion	C4.2 Population living in poverty
Type	Mandatory
Indicator	Number of people living below the poverty threshold divided by the total current population of the city.
Unit of measure	%

Assessment method

This indicator supply information about the number of people living below the poverty threshold. The poverty threshold is the minimum level of income considered adequate in a country. Individuals living below this line are those not able to adequately provide themselves over a 12 months period with water, food, shelter and other basic needs for a healthy life. The indicator is very important to define the social and economic condition of a specific area.

Calculation steps:
- Calculate the number of total current population of the city (A) – denominator
- Calculate the total number of persons in the city living below the poverty threshold by multiplying the number of city households living at or below the poverty threshold by the current average number of persons per household for that city (B) – numerator
- Calculate the value of the indicator as B/A x 100 (%)

Note:
- The poverty threshold for each country is recorded by the World Bank, which can be viewed through its website at: www.worldbank.org or directly on the PovertyNet website at: www.povertynet.org

C.5 Economic performance

Criterion	C5.1 GDP per capita
Type	Mandatory
Indicator	GDP per inhabitant.
Unit of measure	Euro/inhabitant

Assessment method

This indicator defines the economic performance and the development of a city.
It represents the GDP (Gross Domestic Product), that is the value of all final goods and services produced in a given year, divided by the number of population for the same year.

Calculation steps:
- Calculate the total number of city's population (A) - denominator
- Select the city's GDP (B) – numerator
- Calculate the value of the indicator as B/A

Criterion	C5.2 GDP energy intensity
Type	Recommended
Indicator	Total primary energy consumption divided by GDP.
Unit of measure	MJ/euro

Assessment method

This indicator connects the transversal themes of economic productivity, energy efficiency and climate change. Analyzing the values, it' possible to understand if the city decreases over time the energy intensity of its economy (relative decoupling), or increases the GDP and decreases energy demand (absolute decoupling).

Calculation steps:
- Define unit of GDP (A) – denominator
- Define primary energy use (B) – numerator
- Calculate the value of the indicator as B/A

Criterion	C5.3 GDP carbon intensity
Type	Recommended
Indicator	City's total Co2 eq. Emissions divided by GDP.
Unit of measure	Kg CO2/euro

Assessment method

This indicator connects the transversal themes of economic productivity and climate change. Analyzing the values, it' possible to understand if the city decreases over time the carbon intensity of its economy (relative decoupling) or increases the GDP and decreases carbon emissions (absolute decoupling).

Calculation steps:
- Define unit of GDP (B) – denominator
- Define annual CO2 emissions (A) – numerator
- Calculate the value of the indicator as B/A

C.6 Global appeal

Criterion	C6.1 Visitors
Type	Recommended
Indicator	Number of visitors from abroad and domestically.
Unit of measure	n/1000 inhabitants

Assessment method

This indicator shows the attractiveness of a city as a place to live, work, study, visit or for business.

Calculation steps:
- Calculate the one 1000th of the city population (A) – denominator
- Calculate the total number of the visitors from abroad and domestically (B) – numerator
- Calculate the value of the indicator as B/A

C.7 Safety

Criterion	C7.1 Number of firefighters per 100 000 population
Type	Recommended
Indicator	Total number of paid full-time firefighters divided by one 100 000th of the city population.
Unit of measure	n/100.000 inhabitants

Assessment method

The indicator wants to calculate the number of paid firefighters. For firefighter is intended a full-time operational staff member that works to extinguish fires. Volunteer firefighters and staff not directly engaged in fire suppression activities are not considered in the calculation.

Calculation steps:
- Calculate the one 100 000th of the city population (A) – denominator
- Calculate the total number of paid full-time firefighters (B) – numerator
- Calculate the value of the indicator as B/A

C.8 Education

Criterion	C8.1 Female school-aged population
Type	Mandatory
Indicator	Number of female school- aged population enrolled at primary and secondary levels in public and private schools divided by the total number of female school-aged population.
Unit of measure	%

Assessment method

The indicator includes in the calculation primary and secondary levels of education in public and private school, and one part-time enrolment is considered as a full-time enrolment. The percentage wants to show the spread of formal education among school-aged population, to identify the opportunities of development that the cities offer, also in terms of equality between gender and empowerment of women.

Calculation steps:
- Calculate the total number of female school-aged population (A) – denominator
- Calculate the number of female school-aged population enrolled at primary and secondary levels in public and private schools (B) – numerator
- Calculate the value of the indicator as B/A x 100 (%)

Criterion	C8.2 Students completing secondary education
Type	Mandatory
Indicator	Total number of students belonging to a school-cohort who complete the final grade of secondary education divided by the total number of students belonging to a school-cohort.
Unit of measure	%

Assessment method

The indicator considers the students belonging to a school-cohort who complete the final grade of secondary education without failing or moving to another school.

Calculation steps:
- Calculate the total number of students belonging to a school-cohort (A) – denominator
- Calculate the total number of students belonging to a school-cohort who complete the final grade of secondary education (B) – numerator
- Calculate the value of the indicator as B/A x 100 (%)

C.9 Health

Criterion	C9.1 Accessibility to in-patient hospital beds
Type	Mandatory
Indicator	Total number of in-patient public and private hospital beds divided by one 100 000th of the city's total population.
Unit of measure	n/100.000 inhabitants

Assessment method

The number of in-patient public and private hospital beds is an indicator that checks the level of the health service and of the health system.
The in-patient and maternity beds are considered in the calculation, as well as beds in wards closed (lack of health staff and building works) and beds for patients who require continual assistance, incubators and specialized care. But day care beds, pre-anesthesia beds, wake-up beds, beds for patient's family and hospital staff are not taken into consideration.

Calculation steps:
- Calculate the one 100 000th of the city's total population (A) – denominator
- Calculate the total number of in-patient public and private hospital beds (B) – numerator
- Calculate the value of the indicator as B/A

C.10 Shelter

Criterion	C10.1 City population living in slums
Type	Mandatory
Indicator	Number of people living in slums divided by the city population.
Unit of measure	%

Assessment method

It's important to compute the quantity of people living in slum, because it's an indicator of the poverty and the presence of substandard and insecure housing on territory.
UN-HABITAT defines a slum household as a group of individuals living under the same roof in an urban area who lack one or more of the following:
1. Durable housing of a permanent nature that protects against extreme climate conditions
2. Sufficient living space which means not more than three people sharing the same room
3. Easy access to safe water in sufficient amounts at an affordable price
4. Access to adequate sanitation in the form of a private or public toilet shared by a reasonable number of people
5. Security of tenure that prevents forced evictions

Calculation steps:
- Calculate the number of city population (A) – denominator
- Calculate the number of slum households in the city
- Multiply this number by current average household size to obtain the number of people living in slums (B) – numerator
- Calculate the value of the indicator as B/A x 100 (%)

D - Policy and Governance
D.3 Institution

Criterion	D3.1 Women elected
Type	Mandatory
Indicator	Number of elected city-level positions held by women divided by the total number of elected city-level positions.
Unit of measure	%

Assessment method

This indicator reflects the equity between gender in society and the inclusiveness in governance. The number includes the position held by women and directly elected on the city council or in the city government and the elected managerial roles.

Calculation steps:
- Calculate the total number of elected city-level positions (A) – denominator
- Calculate the total number of elected city-level positions held by women (B) – numerator
- Calculate the value of the indicator as B/A x 100 (%)

Criterion	D3.2 Community involvement in urban planning activities
Type	Mandatory
Indicator	Level of involvement of users in urban planning.
Unit of measure	Index

Assessment method

The indicator wants to measure the level of community involvement in planning activities 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?

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 2015 which tends to take into consideration recent evolution in practices (figure 2).
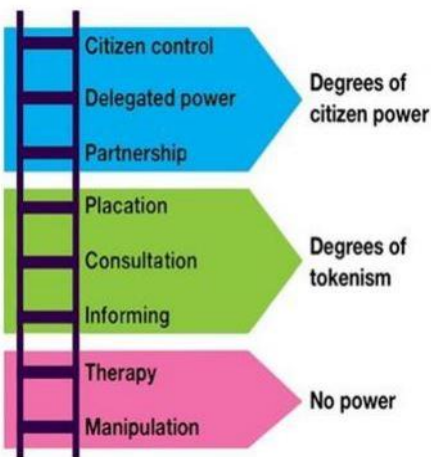

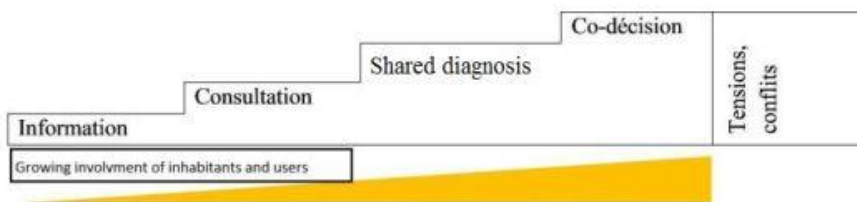Figure 1: Original Arnstein ladder, with 8 rungs and 3 categories.

Figure 2: Assessing inhabitants involvement, Hélène Chelzen and Anne Jégou , from Arnstein and Beuret.

Calculation steps:
To characterize the indicator's value:

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

SCORE -1 (LEVEL 1) Non-participation or manipulation and therapy (in the Arnstein ladder).

SCORE 0 (LEVEL 2) Degrees of tokenism: Information / Consultation / Placation (in the Arnstein ladder).

SCORE 3 (LEVEL 3) Degrees of citizen power: Partnership, delegated power and citizen power (in the Arnstein ladder) in one phase, like diagnosis or after delivery.

SCORE 5 (LEVEL 4) Degrees of citizen power: Partnership, delegated power and citizen power (in the Arnstein ladder), at every stages.

Specifications:

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.

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.

1/ "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.

2 / "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 remain 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.

3 / "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.

Levels for assessment:
Level 0 : Non participation
Level 1 : Degrees of tokenism (information and consultation)
Level 2 : Shared diagnosis
Level 3 : Co-decision

Assessing levels of involvement:
The following table aims at supporting the assessment of the different levels.
It is not exhaustive.

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 or evening or both? Working time or holydays or both ? Where : known community location, changing location?	Schedule of the information and concertation meetings
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