TESTING PROTOCOL

ASSESSMENT REPORT

Version 1.1

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2.1: To raise capacity for better management of energy in public buildings at transnational level
Work package: WP3 TESTING
Activity: 3.3 Test of transnational assessment methods and indicators
Deliverable: 3.3.1 – Testing Protocol

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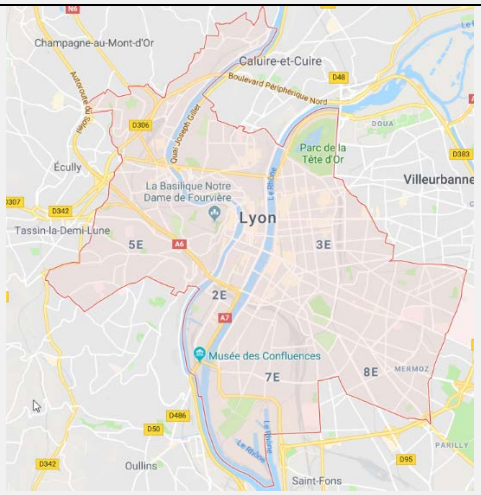
URBAN SCALE ASSESSMENT

1. INITIATION

General information on the selected urban area

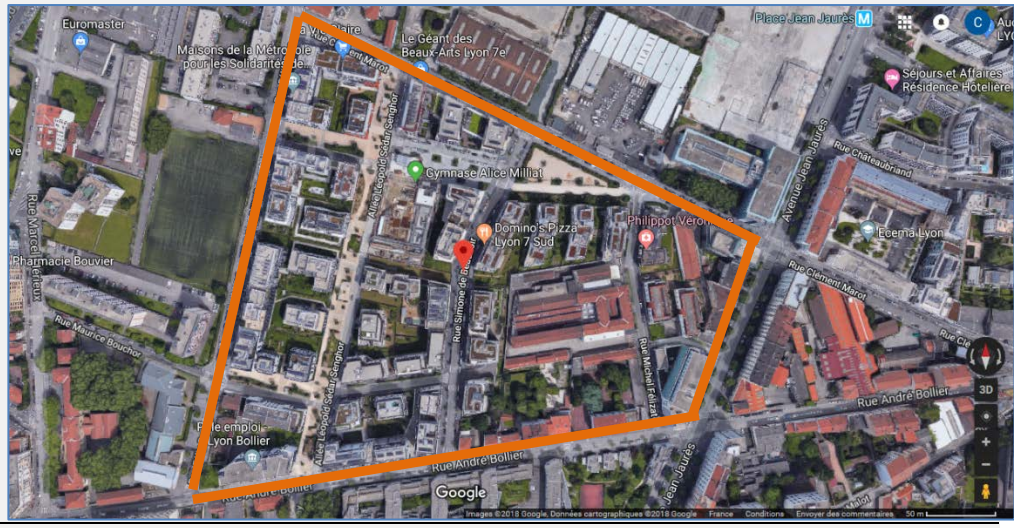
City	*Metropolis of Lyon, city of Lyon*
Brief description	*Lyon is in geographic crossroads of the country, north of the natural corridor of the Rhone Valley (which extends from Lyon to Marseille). Located between the Massif Central to the west and the alpine massif to the east, the city of Lyon occupies a strategic position in north-south traffic in Europe.* *Lyon, historically industrial city, has hosted in the south of the city many petrochemical industries along the Rhone, named the corridor of chemistry. After the departure and closure of the textile industries, Lyon has gradually refocused on the sectors of advanced technology, such as pharmaceuticals and biotechnology. Lyon is also the second largest student city in France, with four universities and several prestigious universities. Finally, the city has retained an important architectural heritage from the Roman era to the twentieth century through the Renaissance. Lyon is also rebuilding new neighborhoods, such as the ZAC du Bon Lait.*
Size (ha)	*The territory of the Metropolis is that of Greater Lyon: 59 municipalities spread over 538 km2. The city of Lyon is spread over 48 km².*
Residential population	*The Metropolis of Lyon includes 1 300 000 inhabitants.* *Lyon's population is the third largest in France, with 513 275 inhabitants.*
Average building density (total m2/land surface m2)	*NSP*
Plan of the urban area	 *City of Lyon*

Metropolis of Lyon

Significant pictures

City of Lyon

City of Lyon

	 *ZAC Bon Lait* 
Description of the adjacent areas	*The neighborhood is located in a dense urban environment, consisting of residential areas, parking areas and businesses*
Property ownership	*Private landlords, social landlords, individuals, community*
Social and economic context	*The economic dynamics of Lyon is a major asset. The city is considered the second most structured city in terms of economic competitiveness, after Paris. Many companies in innovative sectors come to settle each year in the Lyon region. The sectors of the future in Lyon are very dynamic, such as Life Sciences, Cleantech, digital, etc. Lyon is considered a particularly business friendly city. Lyon's economic attractiveness continues unabated and more entrepreneurs are coming every day to enjoy this business-friendly environment.* *Allowing everyone to better live the present and to envisage the future in a positive way is the choice of Lyon, a city of solidarity.* *Committed to social cohesion, Lyon is part of a partnership approach that wants to develop the autonomy of residents: from the most vulnerable to those who need a little help. The Municipal Social Action Center (CCAS) of the City of Lyon and its partners provide solutions to improve the daily life and cope with the difficulties of life. It is through the Houses of the Metropolis for Solidarities that people will be able to access all the services of the CCAS.*
Legal /administrative boundary lines	*As a local authority, the Métropolis of Lyon is administered by a deliberative assembly called "Council of the Metropolis" which regulates, by its "deliberations", the affairs of the metropolis. The Council of the Metropolis is composed today of 165 members: the metropolitan advisers.* *As citizens, the people of Lyon are represented by municipal councilors and councilors from the 9 boroughs. They also have the opportunity to express*

	themselves directly through neighborhood councils and become force of proposal. The 73 Municipal Councilors, from the 9 districts of Lyon, sit on the Municipal Council.
Energy supply infrastructure	- *70,000 housing equivalents connected to 9 heat networks public* *- 9 330 km of electricity network,* *- 2 968 km of gas network, for 3,261 km of roads* *- 13 installations produce heat consumed in the territory with 2 UTVE and 6 wood boilers* *- 3 hydraulic dams representing 58% of energy production of the territory - 175,000 smart meters settled in the territory*
Relevance of the surrounding infrastructures	*Data not available*
Reference stakeholders in retrofit process	*Écoréno'v is a service of the Métropolis of Lyon, supported by the Auvergne-Rhône-Alpes region and ADEME to advise and support projects of eco-renovation of private housing. With Ecoréno'v, all owners, condominiums or single-family homes can be accompanied in this type of project and receive financial assistance for the completion of the work. This program is developped on the city of Lyon.*
Other significant information	*The city of Lyon implements a Climate Energy Plan.* *As part of its climate plan, the Métropolis of Lyon has developed the "référentiel habitat durable" or "sustainable housing" (since 2004) and "référentiel bureau durable" or "sustainable office" (since 2006) standards for new housing and office projects.* *The reference documents are systematically attached to the consultations launched by the Métropole de Lyon on its Z.A.C. and community lands, as well as on social housing operations. They define environmental performance requirements that new construction projects must meet and contain.* *The main objective of these devices is to bring all the actors of the construction of buildings intervening on the Metropole of Lyon (owners, designers, companies) to implement from the conception of each operation until its delivery and its operation, the measures necessary to address the following main issues:* *- Limit greenhouse gas emissions* *- Reduce energy and water consumption* *- Use renewable energies* *- Ensure sustainable management of buildings over time, and give them increased use value* *- Decrease the health impact of manufacturers and users* *The Métropolis of Lyon has also developed the guide "City and Sustainable Neighborhoods, "Guide Ville et quartier durable". Sustainable development consists of taking into account different cross-cutting themes that limit the impact on the environment while achieving a good energy performance on the building.*

2. PREPARATION

a. SNTool structure

In this section it is described the structure of your SNTool.
Please, enter here the list of the criteria selected from the CESBA MED Generic Framework ay Urban scale.
Please remember that KPIs are mandatory.

A- BUILT URBAN SYSTEMS	
A1	**Urban Structure and Form**
A1.7	*Conservation of Land*

B- ECONOMY	
B3	**Cost and Investment**
B3.3	*Running costs energy for public buildings*

C- ENERGY	
C1	**Non-renewable energy**
C1.1	*Total final thermal energy consumption for building operations.*
C1.4	*Total final electrical energy consumption for building operations.*
C1.7	*Total primary energy demand for building operations.*
C2	**Renewable and Decarbonised energy**
C2.1	*Share of thermal energy generation from on-site renewable sources on final thermal energy.*
C2.4	*Share of renewable energy on-site, on total primary energy consumptions for buildings operation.*
C2.7	*Share of electric energy generation from on-site renewable sources on final electric energy.*

D- ATMOSPHERIC EMISSIONS	
D1	**Atmospheric emissions**
D1.2	*Total GHG Emissions from primary energy used in building operations*

E- NON - RENEWABLE RESOURCES	
E1	**Potable water, stormwater and greywater**
E1.6	*Consumption of potable water for residential population.*
E1.7	*Consumption of potable water for non-residential building systems.*
E2	**Solid and Liquid Wastes**
E2.3	Solid waste from construction and demolition projects retained in the area for re-use or recycling.
E3	**Resource consumption, retention and maintenance**
E3.2	Consumption of non-renewable material resources for construction of infrastructure.

F- ENVIRONMENT	
F1	**Environmental impacts**
F1.3	Recharge of groundwater through permeable paving or landscaping.
F2	**Outdoor environmental quality**

F2.3	Ambient air quality with respect to particulates <10 mu (PM10) over a one-year period.

G- SOCIAL ASPECTS	
G2	**Traffic and Mobility Services**
G2.1	*Performance of the public transport service.*
G2.4	*Quality of pedestrian and bicycle network.*
G4	**Public and private facilities and services**
G4.2	*Availability and proximity of key public human services*
G6	**Management and community involvement**
G6.3	Community involvement in urban planning activities

b. SNTool criteria selection rationale

In this section PPs must motivate the selection of the criteria that have been included in the SNTool. Why the criterion has been included? The reason could depend on regional policies, targets, specific characteristics of the territory (i.e. touristic area, agricultural area, etc.…).

A- BUILT URBAN SYSTEMS	
CRITERION	**REASON/MOTIVATION**
A1.7 Conservation of land	*KPI are mandatory; KPI were sufficient for local purposes. The "ZAC du Bon Lait" area* is located on a former industrial wasteland, so there was no agricultural or natural land to preserve. This criterion has been retained because the territory of the Metropolis is large and some areas are landscaped with natural areas.

B- ECONOMY	
CRITERION	**REASON/MOTIVATION**
B3.3 Running costs energy for public buildings	*KPI are mandatory; KPI were sufficient for local purposes*

C- ENERGY	
CRITERION	**REASON/MOTIVATION**
C1.1 Total final thermal energy consumption for building operations	*KPI are mandatory; KPI were sufficient for local purposes*
C1.4 Total final electrical energy consumption for building operations	*KPI are mandatory; KPI were sufficient for local purposes*
C1.7 Total primary energy demand for building operations	*. KPI are mandatory; KPI were sufficient for local purposes*
C2.1 Share of thermal energy generation from on-site renewable sources on final thermal energy	*KPI are mandatory; KPI were sufficient for local purposes*
C2.7 Share of electric energy generation from on-site renewable sources on final electric energy.	*KPI are mandatory; KPI were sufficient for local purposes*

D- ATMOSPHERIC EMISSIONS	
CRITERION	**REASON/MOTIVATION**
D1.2 Total GHG Emissions from primary energy used in building operations	*KPI are mandatory; KPI were sufficient for local purposes*

E- NON - RENEWABLE RESOURCES	
CRITERION	**REASON/MOTIVATION**
E1.6 Consumption of potable water for residential population.	*KPI are mandatory; KPI were sufficient for local purposes*
E1.7 Consumption of potable water for non-residential building systems.	*KPI are mandatory; KPI were sufficient for local purposes*

F- ENVIRONMENT	
CRITERION	**REASON/MOTIVATION**
F1.3 Recharge of groundwater through permeable paving or landscaping	*KPI are mandatory; KPI were sufficient for local purposes*
F2.3 Ambient air quality with respect to particulates <10 mu (PM10) over a one-year period	*KPI are mandatory; KPI were sufficient for local purposes*

G- SOCIAL ASPECTS	
CRITERION	**REASON/MOTIVATION**
G2.1 Performance of the public transport service	*KPI are mandatory; KPI were sufficient for local purposes*
G2.4 Quality of pedestrian and bicycle network	*KPI are mandatory; KPI were sufficient for local purposes*
G4.2 Availability and proximity of key public human services	*KPI are mandatory; KPI were sufficient for local purposes*
G6.3 Community involvement in urban planning activities	*KPI are mandatory; KPI were sufficient for local purposes*

c. SNTool weights rationale

In this section PPs must motivate the value of weights assigned to issues, categories and criteria. Why the weight of a particular issue or criterion is higher (or lower)? Weights should reflect the regional political priorities.

ISSUES WEIGHTS

ISSUE	WEIGHTING FACTOR (1 to 3)	MOTIVATION
A- BUILT URBAN SYSTEMS	1	Default values from CESBA MED PPs were relevant
B- ECONOMY	2	Default values from CESBA MED PPs were relevant
C- ENERGY	3	Default values from CESBA MED PPs were relevant
D- ATMOSPHERIC EMISSIONS	3	Default values from CESBA MED PPs were relevant
E- NON - RENEWABLE RESOURCES	2	Default values from CESBA MED PPs were relevant
F- ENVIRONMENT	2	Default values from CESBA MED PPs were relevant
G- SOCIAL ASPECTS	2	Default values from CESBA MED PPs were relevant

CATEGORIES WEIGHTS

Note: the categories weight results automatically from the criteria level

CATEGORIES	WEIGHT (%)
A1- Urban Structure and Form	0
A2- Transportation Infrastructure	0
SUB TOTAL	0
B1- Economic Structure and Value	0
B2- Economic activity	0
B3- Cost and Investment	1,8
SUB TOTAL	1.8
C1- Non-renewable energy	12,6
C2- Renewable and Decarbonised energy	15,6
C3- Energy recycling and storage	0
SUB TOTAL	28.2
D1- Atmospheric emissions	33,9
SUB TOTAL	33.9
E1- Potable water, stormwater and greywater	4,8
E2- Solid and Liquid Wastes	1,2
E3- Resource consumption, retention and maintenance	2,7
SUB TOTAL	8,7
F1- Environmental impacts	1,8
F2- Outdoor environmental quality	8,1

F3- Ecosystems and landscapes	0
SUB TOTAL	9.9
G1- Safety and Accessibility	0
G2- Traffic and Mobility Services	9
G3- Communication services	0
G4- Public and private facilities and services	3,6
G5- Local Food	0
G6- Management and community involvement	4,8
G7- Society, Culture and Heritage	0
G8- Perceptual	0
SUB TOTAL	17,4
TOTAL	100

CRITERIA WEIGHTS

CESBA MED GF-U, sheet WeightsA: B= Impact of the Potential Effect (1-3), C=Extent of potential effect (1-5), D=Duration of potential effect (1-5)

CESBA MED SNTool, sheet WeightsB: LF = Local Factor

A- BUILT URBAN SYSTEMS

A1- Urban Structure and Form

CRITERION	Weight (%)	B	C	D	L.F.	L.F. REASON/MOTIVATION
A1.7 Conservation of land	*2,25*	*2*	*2*	*4*	*0*	*Default values from CESBA MED PPs were relevant*
TOTAL		2.25				

B- ECONOMY

B3-Cost and investment

CRITERION	Weight (%)	B	C	D	L.F.	L.F. REASON/MOTIVATION
B3.3 Running costs energy for public buildings	*1,69*	*1*	*2*	*3*	*1,8*	*Default values from CESBA MED PPs were relevant*
TOTAL		1.69				

C- ENERGY

C1-Non-renewable energy

CRITERION	Weight (%)	B	C	D	L.F.	L.F. REASON/MOTIVATION
C1.1 Total final thermal energy consumption for building operations	*5,06*	*3*	*2*	*3*	*5,4*	*Default values from CESBA MED PPs were relevant*
C1.4 Total final electrical energy consumption for building operations	*3,37*	*3*	*2*	*2*	*3,6*	*Default values from CESBA MED PPs were relevant*
C1.7 Total primary	*3,37*	*3*	*2*	*2*	*3.6*	*Default values from CESBA MED PPs were*

energy demand for building operations.						*relevant*
C2 Renewable and Decarbonised energy						
CRITERION	Weight (%)	B	C	D	L.F.	L.F. REASON/MOTIVATION
C2.1 Share of thermal energy generation from on-site renewable sources on final thermal energy	*7,58*	*3*	*2*	*3*	*8,1*	*Default values from CESBA MED PPs were relevant*
C2.4 Share of renewable energy on-site, on total primary energy consumptions for buildings operation	*5,06*	*2*	*2*	*3*	*5,4*	*Default values from CESBA MED PPs were relevant*
C2.7 Share of electric energy generation from on-site renewable sources on final electric energy	*3,79*	*1*	*3*	*3*	*2*	*Default values from CESBA MED PPs were relevant*
TOTAL		28.23				

D- ATHMOSPHERIC EMISSIONS						
D1- Athmospheric emissions						
CRITERION	**Weight (%)**	**B**	**C**	**D**	**L.F.**	**L.F. REASON/MOTIVATION**
D1.2 Total GHG Emissions from primary energy used in building operations	*31,6*	*3*	*5*	*5*	*33,9*	*Default values from CESBA MED PPs were relevant*
TOTAL		31.6				

E- NON-RENEWABLE RESOURCES						
E1- Potable water, stormwater and greywater						
CRITERION	**Weight (%)**	**B**	**C**	**D**	**L.F.**	**L.F. REASON/MOTIVATION**
E1.6 Consumption of potable water for residential population	*3.37*	*3*	*2*	*2*	*3.6*	*Default values from CESBA MED PPs were relevant*
E1.7 Consumption of potable water for non-residential building systems.	*1.12*	*1*	*2*	*2*	*1.2*	
E2 Solid and Liquid Wastes						
CRITERION	**Weight (%)**	**B**	**C**	**D**	**L.F.**	**L.F. REASON/MOTIVATION**
E.2.3 Solid waste from construction and demolition projects retained in the area for re-use or recycling	*1.12*	*1*	*2*	*2*	*1.2*	*Default values from CESBA MED PPs were relevant*
E3 Resource consumption, retention and maintenance						
CRITERION	**Weight (%)**	**B**	**C**	**D**	**L.F.**	**L.F. REASON/MOTIVATION**
E3.2 Consumption of non-renewable	**5,06**	**3**	**2**	**3**	**2.7**	*Default values from CESBA MED PPs were relevant*

material resources for construction of infrastructure		
TOTAL	10.67	

F- ENVIRONMENT

F1-Environmental impacts

CRITERION	Weight (%)	B	C	D	L.F.	L.F. REASON/MOTIVATION
F1.3 Recharge of groundwater through permeable paving or landscaping	*1.69*	*1*	*2*	*3*	*1.8*	*Default values from CESBA MED PPs were relevant*
F2-Outdoor environmental quality						
F2.3 Ambient air quality with respect to particulates <10 mu (PM10) over a one-year period.	*7.58*	*3*	*3*	*3*	*8.1*	*Default values from CESBA MED PPs were relevant*
TOTAL		9.27				

G- SOCIAL ASPECTS

G2- Traffic and Mobility Services

CRITERION	Weight (%)	B	C	D	L.F.	L.F. REASON/MOTIVATION
G2.1 Performance of the public transport	*5.06*	*3*	*2*	*3*	*5.4*	*Default values from CESBA MED PPs were relevant*
G2.4 Quality of pedestrian and bicycle network	*3.37*	*2*	*2*	*3*	*3.6*	*Default values from CESBA MED PPs were relevant*
G4 - Public and private facilities and services						
G4.2 Availability and proximity of key public human services	*3.37*	*2*	*2*	*3*	*3.6*	*Default values from CESBA MED PPs were relevant*
G6 - Management and community involvement						
G6.3 Community involvement in urban planning activities	*4.49*	*2*	*2*	*1*	*4.8*	*Default values from CESBA MED PPs were relevant*
TOTAL		16.29				
TOTAL		100				

d. SNTool benchmarks rationale

In this section PPs must motivate the value of benchmarks assigned to the different criteria for score zero (minimum acceptable performance) and for score 5 (excellent and ideal performance). The value of indicators corresponding to score zero is usually depends on regulations, standards or a typical performance in the region. Please keep in mind that score 3 represents a best practice performance. Score 5 is an excellent performance.

A- URBAN STRUCTURE AND FORM				
CRITERION	INDICATOR	UNIT OF MEASURE	BENCHMARK	RATIONALE
A1.7 Conservation of land	*The total area of undeveloped land considered to be of value for ecological or agricultural purposes by relevant authorities, as a percent of the total local area.*	%	*0: 10%*	Local planning rules
			3 : 16% *5: 20%*	Mid value Local planning rules

B- ECONOMY				
CRITERION	INDICATOR	UNIT OF MEASURE	BENCHMARK	RATIONALE
B3.3 Running costs energy for public buildings	Running cost of energy aggregated	Euro/m2/year	*0: 14*	Hypothesis to establish the values of practices: a gymnasium of 2700 m² built with a high energy level, and a nursery of 900 m² new
			3 : 7,7 *5: 3,5*	Mid value

C- ENERGY				
CRITERION	INDICATOR	UNIT OF MEASURE	BENCHMARK	RATIONALE
C1.1 Total final thermal energy consumption for building operations	Aggregated annual total final thermal energy consumption / gross floor area of all buildings	kWh/m2/year	*0: 50*	*Default values from CESBA MED PPs were relevant*
			3 : 20 *5: 0*	Mid value *Default values from CESBA MED PPs were relevant*
C1.4 Total final electrical energy consumption for building operations	Aggregated annual total final electric energy consumption / Total gross floor area of all buildings	kWh/m2/year	0 : 55	Value Score 0 : Result new collective dwellings RT2012: New: Compliance with the new thermal regulations to come: RE 2020, level E1, respect for the share of

			3 : 25 5 : 5	electricity Mid value New: RE 2020, level E4, respect of the share of electricity
C1.7 Total primary energy demand for building operations.	Buildings total primary energy consumption / local minimum value	kWh/m2/year	0 : 140 3 : 56 5 : 0	Result new collective dwellings RT2012 Mid value Result new collective dwellings RT2012
C2.1 Share of thermal energy generation from on-site renewable sources on final thermal energy	Share of renewable thermal energy in final thermal energy consumptions	%	0 : 30 3 : 80 5 : 100	Scores based on the City of Lyon Sustainable Cities Guide, which imposes this ratio
C2.4 Share of renewable energy on-site, on total primary energy consumptions for buildings operation	Share of renewable energy in primary energy consumptions	%	0 : 30 3 : 80 5 : 100	Sores based on the City of Lyon Sustainable Cities Guide, which imposes this ratio for all renewable energies combined, thermal and electrical
C2.7 Share of electric energy generation from on-site renewable sources on final electric energy	Share of renewable electric energy in final electric energy consumptions	%	0 : 35 3 : 59 5 : 75	Score based on the City of Lyon Sustainable Cities Guide Mid value Score based on the City of Lyon Sustainable Cities Guide

D- ATMOSPHERIC EMISSIONS				
CRITERION	INDICATOR	UNIT OF MEASURE	BENCHMARK	RATIONALE
D1.2 Total GHG Emissions from primary energy used in building operations	CO_2 equivalent emissions per useful internal floor area per year	kg CO_2 eq./m2/yr	0 : 30 3 : 18 5 : 10	Default values from CESBA MED PPs were relevant Mid value Default values from CESBA MED PPs were relevant

E- NON-RENEWABLE RESOURCES				
CRITERION	INDICATOR	UNIT OF MEASURE	BENCHMARK	RATIONALE
E1.6 Consumption of potable water for residential population	Water consumption per occupant	m_3 per occupant* yr	0 : 68 3 : 50 5 : 30	187 liters, 365 days of presence 150 liters, no bath, lower tap flow, 335 days of presence 90 liters, 335 days of presence
E1.7 Consumption of potable water for non-residential building	Water consumption per m^2	m_3 per m^2	0 : 1,1 3 : 0,55 5 : 0,4	Use of the water calculator tool for offices, estimate with

systems				200 users
E2.3 Solid waste from construction and demolition projects retained in the area for re-use or recycling	Volume of materials that may be re-used or recycled from the local area on the total solid waste from construction and demolition of building projects	%	0 : 50 3 : 68 5 : 80	Hypothesis: reuse of possible materials on projects Mid value Hypothesis: reuse of possible materials on projects
E3.2 Consumption of non-renewable material resources for construction of infrastructure	Quantity of materials from non-renewable material resources for construction or renovation of infrastructures in the local area over a 5-year period	Tonnes/ 1000 m2	0 : 150 3 : 108 5 : 80	Default values from CESBA MED PPs were relevant

F- ENVIRONMENT

CRITERION	INDICATOR	UNIT OF MEASURE	BENCHMARK	RATIONALE
F1.3 Recharge of groundwater through permeable paving or landscaping	Permeable area / total area	%	0 : 20 3 : 68 5 : 100	The values given for practice are default values, to be adapted to the local context (local plan of urban planning and habitat PLU-H).
F2.3 Ambient air quality with respect to particulates <10 mu (PM10) over a one-year period.	Number of days exceeding the daily limits in a year	n	0 : 30 3 : 18,6 5 : 11	Observatory of the quality of the air www.atmo-auvergnerhonealpes.fr

G- SOCIAL ASPECTS

CRITERION	INDICATOR	UNIT OF MEASURE	BENCHMARK	RATIONALE
G2.1 Performance of the public transport service	Percentage of inhabitants that are within 400 meters walking distance of at least one public transportation service stop.	%	0 : 0 3 : 100 5 : 100	Global Platform for Sustainable Cities - Urban Sustainability Framework City of Lyon Sustainable Cities Guide
G2.4 Quality of pedestrian and bicycle network	Total walkway meters of dedicated	m/100 inhabitants	0 : 200 3 : 110 5 : 50	Global Platform for Sustainable Cities - Urban

	pedestrian paths and meters of bicycle path per 100 inhabitants.			Sustainability Framework
G4.2 Availability and proximity of key public human services	Percentage of inhabitants that are within 800 meters walking distance of at least 3 key services	%	0 : 30 3 : 72 5 : 100	Global Platform for Sustainable Cities - Urban Sustainability Framework City of Lyon Sustainable Cities Guide
G6.3 Community involvement in urban planning activities	Level of involvement of users in urban planning	Level	0 : Symbolic participation (Arnstein correspondence: information and consultation): consultation (public register, survey ...) 3 : Shared diagnosis (Correspondence Arnstein: Degrees of citizen power): Methodology of shared diagnosis, call to a specialized provider, survey (s), Workshops of construction and validation of the diagnosis 5 : Co-decision (Arnstein Correspondence: Degrees of Citizen Power): Methodology of the process, call for a specialized service provider, dedicated workshops, existence of scenarios for discussion, evolution of the project according to citizen feedback	

e. SNTool Criteria Specifications

In this section PPs must indicate for each selected criterion:

- *Information source: The source of the data/information that will be used to characterize the value of the indicator. Example: monitored data, measured data, statistic data, models and simulation, studies, data banks, etc.*
- *Assessment method: Short and concise description of the assessment method used to verify the value of indicators. Example: calculation steps, data analysis process, monitoring procedure, content of a study, use of statistic data, etc.*
- *Standards: technical documents taken as reference for the assessment method.*

A- BUILT URBAN SYSTEMS			
CRITERION	**INDICATOR**	**SPECIFICATIONS**	
A1.7 Conservation of land	The total area of undeveloped land considered	*Information source*	*Local planning rules*
		Assessment method	*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.*
		Standard	*Default values*

B- ECONOMY			
CRITERION	**INDICATOR**	**SPECIFICATIONS**	
B3.3 Running costs energy for public buildings	Running cost of energy aggregated	*Information source*	*Models and simulation*
		Assessment method	In the calculation it is possible to use real or estimated costs. The calculation has to take in account one full year of operation.
		Standard	Sum of the running energy costs of each building in the area up to an aggregated running costs energy value. The total cost must be normalized per the total indoor useful area of buildings.

C- ENERGY			
CRITERION	**INDICATOR**	**SPECIFICATIONS**	
C1.1 Total final thermal energy	Aggregated annual total final thermal	*Information source*	*Models and simulation*

consumption for building operations	energy consumption / gross floor area of all buildings	*Assessment method*	Estimated data: 1. Calculate the annual total final thermal energy consumption for building operations (heating, cooling, domestic hot water), in kWh, for each building in the local area. 2. Calculate the aggregated annual total final thermal energy consumption for all buildings. 3. Calculate: Aggregated annual total final thermal energy consumption / Total gross area of all buildings. Calculations are based on EN 13790 using the quasi-steady state monthly method
		Standard	*ec.europa.eu/energy/en/topics/energy-efficiency/buildings* *https://www.iea.org/publications/freepublications/.../buildings_certification.pdf* *www.theicct.org/sites/default/files/.../ICCTupdate_EU-95gram_jan2014.pdf* *NF EN ISO 52016 Performance énergétiques des bâtiments*
C1.4 Total final electrical energy consumption for building operations	Aggregated annual total final electric energy consumption / Total gross floor area of all	Information source	*Models and simulation*
		Assessment method	Use of Estimated data: 1. Calculate the annual total final electric energy consumption for building operations (heating, cooling, ventilation, auxiliaries, domestic hot water and lighting), in kWh, for each building in the local area (i.e. residential and non-residential). 2. Calculate the aggregated annual total final electric energy consumption for all buildings. 3. Calculate: aggregated annual total final electric energy consumption / total gross area of all buildings Calculations are based on EN 13790 using the quasi-steady state monthly method.
		Standard	The terminals are computable with the national thermal regulation for this final energy indicator assuming that all the energy of the building is electric (even heating and domestic hot water). Soone : the new RE2020 regulation
C1.7 Total primary energy demand for building operations.	Buildings total primary energy consumption / local minimum value	Information source	*Models and simulation*
		Assessment method	1. Calculate the annual total primary energy consumption of non-renewable energy for building operations (heating, cooling, ventilation, auxiliaries, domestic hot water and lighting), in kWh/m2 of useful internal floor area for each building in the local area (i.e. residential and non-residential). 2. Calculate urban area total primary energy consumption as the weighted mean value of total primary energy consumption over the

			floor surfaces of all buildings in the area. 3. Calculate: Buildings total primary energy consumption / local minimum value x 100
		Standard	Calculations are based on EN 13790
C2.1 Share of thermal energy generation from on-site renewable sources on final thermal energy	Share of renewable thermal energy in final thermal energy consumptions	Information source	*Models and simulation*
		Assessment method	Estimated data Calculate the annual total final thermal energy consumption for building operations (heating, cooling, domestic hot water), in kWh, for each building in the local area (i.e. residential and non-residential) including renewables, if applicable, in the existing condition. Calculate the aggregated annual total thermal final energy consumption for all buildings. Calculate the annual total final thermal energy consumption for building operations (heating, cooling, domestic hot water), in kWh, for each building in the local area (i.e. residential and non-residential) from on-site renewable energy sources. Calculate the aggregated annual total final thermal energy consumption from on-site renewable energy sources. Calculate: Aggregated annual total final thermal energy consumption from on-site renewable energy sources/ Aggregated annual total final thermal energy consumption.
		Standard	Calculations are based on EN 13790.
C2.4 Share of renewable energy on-site, on total primary energy consumptions for buildings operation	Share of renewable energy in primary energy consumptions	Information source	Models and simulation
		Assessment method	1. Calculate the annual total primary energy consumption for building operations (heating, cooling, domestic hot water and lighting), in kWh, for each building in the local area (i.e. residential and non-residential) including renewables, if applicable, in the existing condition. 2. Calculate the aggregated annual total primary energy consumption for all buildings. 3. Calculate the annual total primary energy consumption for building operations (heating, cooling, domestic hot water and lighting), in kWh, for each building in the local area (i.e. residential and non-residential) from on-site renewable energy sources, if applicable. 4. Calculate the aggregated annual total primary energy consumption from on-site renewable energy sources for all buildings. 5. Calculate: Aggregated annual total primary energy consumption / Aggregated annual total primary energy consumption without the renewables.
		Standard	Calculations are based on EN 13790

		Information source	Models and simulation
C2.7 Share of electric energy generation from on-site renewable sources on final electric energy	Share of renewable electric energy in final electric energy consumptions	Assessment method	Use of Estimated data: 1. Calculate the annual total final electric energy consumption for building operations (heating, cooling, domestic hot water, ventilation, lighting, auxiliaries), in kWh, for each building in the local area (i.e. residential and non-residential) including renewables, if applicable, in the existing condition. 2. Calculate the aggregated annual total electric final energy consumption for all buildings. 3. Calculate the annual total final electric energy consumption for building operations (heating, cooling, domestic hot water, lighting, ventilation, auxiliaries), in kWh, for each building in the local area (i.e. residential and non-residential) from on-site renewable energy sources, if applicable. 4. Calculate the aggregated annual total final electric energy consumption from on-site renewable energy sources. 5. Calculate: Aggregated annual total final electric energy consumption from on-site renewable energy sources/ Aggregated annual total final electric energy consumption. Calculations are based on EN 13790 using the quasi-steady state monthly method.
		Standard	Calculations are based on EN 13790

D- ATMOSPHERIC EMISSIONS			
CRITERION	**INDICATOR**	**SPECIFICATIONS**	
D1.2 Total GHG Emissions from primary energy used in building operations	CO2 equivalent emissions per useful internal floor area per year	*Information source*	Models and simulation
		Assessment method	*For each building in the area calculate the emissions of CO2 eq. with the following formula:* *E=[∑ (Qfuel,i x LHVi × Kem,i)+ (Qel × Kem,el)+(Qdh × Kem,dh)]* *Qfuel,I = annual quantity of i-th fuel (m3 or Kg)* *Qel = annual quantity of electric energy from the grid (kWh)* *Qdh = annual quantity of energy from district heating/cooling (kWh)* *LHVi = lower heating value of the i-th fuel (kWh/m3 or kWh/Kg)* *Kem,i = CO2 eq. emission factor of the i-th fuel (Kg CO2/kWh)* *Kem,i = CO2 eq. emission factor of the electric energy from the grid (Kg CO2/kWh)* *Kem,i = CO2 eq. emission factor of energy from district heating/cooling (Kg CO2/kWh)* *Calculate the aggregated annual total CO2*

			equivalent emissions from all buildings / total useful internal floor area of all buildings. *Aggregate GHG emissions from primary energy (including fossil fuel used to generate electricity and used directly in building equipment) for all purposes in building operations in the local area, in kg of CO2-eq per 1000 m2 of surface area per year.*
		Standard	*National Values of Emissions References Related to the Energy Mix*

E- NON-RENEWABLE RESOURCES			
CRITERION	**INDICATOR**	**SPECIFICATIONS**	
E1.6 Consumption of potable water for residential population	Water consumption per occupant	*Information source*	Models and simulation
		Assessment method	*Calculate the estimated consumption of potable water used in residential households in the local area, in Litres per person per day (Lpp*yr.)* *1. For each building calculate the total water consumption. The principle of the per occupant water consumption calculation for taps, toilets and showers.* *2. Calculate the aggregated annual total water consumptions from all residential buildings / number of residentials' buildings occupants.*
		Standard	Tool "Water calculator"
E1.7 Consumption of potable water for non-residential building systems	Water consumption per occupant	Information source	Models and simulation
		Assessment method	1) For each non-residential public building, collect the monitored annual water consumptions for building operation. The consumption data must be estimated taking the average over 3 years period (m 3). 2) Sum the annual water consumption of each building up to an aggregated annual total water consumption (m 3 /year). 3) Estimate the area of public buildings considered for the calculation. 4) Calculate the indicator's value as: aggregated annual total water consumption / area of public buildings.
		Standard	Tool "Water calculator"
E2.3 Solid waste	Volume of materials	Information	Studies, data banks

from construction and demolition projects retained in the area for re-use or recycling	that may be re-used or recycled from the local area on the total solid waste from construction and demolition of building projects	source	
		Assessment method	1. Identify the annual volume of construction/demolition waste generated over a 3-year period; 2. Sample the waste stream to identify the origin (type of building) for each sample and the approximate proportion of materials that could have been recycled or re-used; 3. Estimate the volume of material that could be re-used or recycled from future projects of the same type; 4. Aggregate the volume of materials that may be re-used or recycled per year from the local area, based on current rates of construction and demolition; 5. Calculate the volume of materials that may be re-used or recycled from the local area on the total solid waste from construction and demolition projects.
		Standard	Life cycle analysis tools, 2020 environmental regulation with carbon level assessment
E3.2 Consumption of non-renewable material resources for construction of infrastructure	Quantity of materials from non-renewable material resources for construction or renovation of infrastructures in the local area over a 5-year period	Information source	Studies, data banks
		Assessment method	Calculate the aggregate consumption of non-renewable material resources for construction or renovation of infrastructure in the local area over a 5-year period, in tonnes per 1,000 m2 of surface area (i.e roads, bridges, etc).
		Standard	Life cycle analysis tools, 2020 environmental regulation with carbon level assessment

F- ENVIRONMENT			
CRITERION	**INDICATOR**	**SPECIFICATIONS**	
F1.3 Recharge of groundwater through permeable paving or landscaping	Permeable area / total area	*Information source*	Area development plans
		Assessment method	*1. Calculate the size (Sa) of the urban area (m2).* *2. Calculate the size of the surfaces with a different paving or occupied by constructions in the urban area (i.e green areas, surfaces paved with asphalt, surfaces occupied by buildings, etc.).* *3. Calculate the real permeability of soil considering the permeability coefficient of each surface.* *4. Examples of permeability coefficients:* *Grass = 1* *Gravel = 0,9* *Permeable interlocking concrete pavement = 0,3* *Asphalt = 0* *5. Value of the indicator = (Sa,perm/Sa) ×100*

		Standard	*Local context of the local plan of urban planning and habitat (PLU-H).*
F2.3 Ambient air quality with respect to particulates <10 mu (PM10) over a one-year period.	Number of days exceeding the daily limits in a year	Information source	Measured data
		Assessment method	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.
		Standard	Observatory of the quality of the air www.atmo-auvergnerhonealpes.fr

G- SOCIAL ASPECTS			
CRITERION	**INDICATOR**	**SPECIFICATIONS**	
G2.1 Performance of the public transport service	Percentage of inhabitants that are within 400 meters	*Information source*	Measured data
		Assessment method	*1. Calculate the percentage of the inhabitants in the area that are within 400 meters walking distance of at least one public transportation service stop (bus, tram, metro).* *Note: to be considered valid for the calculation, a stop must have a daily total service frequency of at least 20 trips.*
		Standard	*Global Platform for Sustainable Cities - Urban Sustainability Framework*
G2.4 Quality of pedestrian and bicycle network	Total walkway meters of dedicated	Information source	Estimated data
		Assessment method	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 indictor's value as (A+B)/(100 inhabitants) Bicycle paths and pedestrian paths have to be safe and physically separated to traffic roads to be considered in the calculation. A walkway adjacent to a traffic road is not acceptable.
		Standard	Global Platform for Sustainable Cities - Urban Sustainability Framework
G4.2 Availability and proximity of key public human	Percentage of inhabitants that are within 800	Information source	Local implementation plans
		Assessment	1. Identify locations of key services in the local area.

services		method	2. Calculate the percentage of the inhabitants that are within 800 meters walking distance from at least 3 key services. 3. Calculate the percent of residential population located within 600 m. of the 3 key human services. Key services are: 1. Education (schools, kindergartens, education centers, etc.) 2. Health center (hospitals, medical ward, medical center, etc.) 3. Law enforcement areas (police station, etc.) 4. Sport facilities 5. Food shops 6. Bank 7. Post office 8. Pharmacy 9. Shopping center 10. Culture and leisure
		Standard	Global Platform for Sustainable Cities - Urban Sustainability Framework sustainable urban development in the Paris region: the light of participatory observation ", Development Sustainable Development and Territories [Online], Vol. 6, No. 2 | September 2015, posted on September 30, 2015 "
G6.3 Community involvement in urban planning activities	Level of involvement of users in urban planning	Information source	Local informations from owner, developer
		Assessment method	Using the Sherry Arnstein ladder on citizen participation, rate the level of users' involvement on planning. The height rungs and 3 degrees of the ladder are provided on the picture.
		Standard	"Sherry Arnstein, article original paru en 1969 ""A Ladder Of Citizen Participation"", Journal of the American Institute of Planners 35 (4), p. 216-24: http://www.participatorymethods.org/sites/participatorymethods.org/files/Arnstein%20ladder%201969.pdf"

3. DIAGNOSIS

a. Performance scores

Evaluation of the actual performance and relative level of sustainability of the urban area. PPs have to indicate the scores reached.

Same scores as the results in the following table

	SCORE
A – BUILT URBAN SYSTEMS	same scores as the results in the following table
A1 – Urban Structure and Form	
A1.7 – Conservation of land	0
B – ECONOMY	
B3 – Cost and Investment	
B3.3 – Running costs energy for public buildings	
C – ENERGY	
C1 – Non-renewable energy	
C1.1 – Total final thermal energy consumption for building operations	
C1.4 Total final electrical energy consumption for building operations	
C1.7 Total primary energy demand for building operations.	
C2.1 Share of thermal energy generation from on-site renewable sources on final thermal energy	
C2.4 Share of renewable energy on-site, on total primary energy consumptions for buildings operation	
C2.7 Share of electric energy generation from on-site renewable sources on final electric energy	
D – ATMOSPHERIC EMISSIONS	
D1 – Atmospheric emissions	
D1.2 – Total GHG Emissions from primary energy used in building operations	
E – NON RENEWABLE SOURCES	
E1 – Potable water, stormwater and greywater	
E1.6 – Consumption of potable water for residential population	
E1.7 Consumption of potable water for non-residential building systems.	
E2 - Solid and Liquid Wastes	
E2.3 Solid waste from construction and demolition projects retained in the area for re-use or recycling	
E3 - Resource consumption, retention and maintenance	
E3.2 Consumption of non-renewable material resources for construction of infrastructure	
F – ENVIRONMENT	
F1 – Environmental impacts	
F1.3 – Recharge of groundwater through permeable paving or landscaping	
F2 – Outdoor environmental quality	
F2.3 Ambient air quality with respect to particulates <10 mu (PM10) over a one-year period.	
G – SOCIAL ASPECTS	

G2 – Traffic and Mobility Services	
G2.1 – Performance of the public transport service	
G2.4 - Quality of pedestrian and bicycle network	
G4 - Public and private facilities and services	
G4.2 Availability and proximity of key public human services	
G6 - Management and community involvement	
G6.3 - Community involvement in urban planning activities	

b. Key Performance Indicators value

Area : ZAC Bon Lait, Lyon

KPI	Indicator	Unit of measure	Value	Score
A 1.7 Conservation of Land	The total area of undeveloped land considered to be of value for ecological or agricultural purposes by relevant authorities, as a percent of the total local area	%	0	-1
B.3.3 Running costs energy for public buildings	Running cost of energy aggregated	Euro/m^2/year	5,9	3
C.1.1 Total final thermal energy consumption for building operations	Aggregated annual total final thermal energy consumption / gross floor area of all buildings	kWh/m^2/year	41	3
C.1.4 Total final electrical energy consumption for building operations	Aggregated annual total final electric energy consumption / Total gross floor area of all buildings	kWh/m^2/year	7	3
C.1.7 Total primary energy demand for building operations	Buildings total primary energy consumption / local minimum value	kWh/m2/year	53	3
C.2.1 Share of thermal energy generation from on-site renewable sources on final thermal energy	Share of renewable thermal energy in final thermal energy consumptions	%	32	0
C.2.4 Share of renewable energy on-site, on total primary energy consumptions for buildings operation	Share of renewable energy in primary energy consumptions	%	25	-1
C.2.7 Share of electric energy generation from on-site renewable sources on final electric energy	Share of renewable electric energy in final electric energy consumptions	%	0	-1
D.1.2 Total GHG Emissions from primary energy used in building operations	CO_2 equivalent emissions per useful internal floor area per year	kg CO_2 eq./m2/yr	8	5
E.1.6 Consumption of potable water for residential population	Water consumption per occupant	m^3 per occupant*yr	62	0
E.1.7 Consumption of potable water for non-residential building systems	Water consumption per occupant	m^3 per m^2	0,5	0
E.2.3 Solid waste from construction and demolition projects retained in the area for re-use or recycling	Volume of materials that may be re-used or recycled from the local area on the total solid waste from construction and demolition projects	%	72	3
E.3.2 Consumption of non-renewable material resources for construction of infrastructure	Quantity of materials from non-renewable material resources for construction or renovation of infrastructures in the local area over a 5-year period	Tonnes/ 1000 m2	100	3
F.1.3 Recharge of groundwater through permeable paving or landscaping	Permeable area / total area	%	30	0
F.2.3 Ambient air quality with respect to particulates <10 mu (PM10) over a one year period	Number of days exceeding the daily limits in a year	n	11,5	3
G.2.1 Performance of the public transport service	Percentage of inhabitants that are within 400 meters walking distance of at least one public transportation service stop.	%	80	0
G.2.4 Quality of pedestrian and bicycle network	Total walkway kilometers of dedicated pedestrian paths and kilometers of	m/100 inhabitants	9400	3

	bicycle path per 1.000 inhabitants.			
G.4.2 Availability and proximity of key services	Percentage of inhabitants that are within 800 meters walking distance of at least 3 key public services	%	100	5
G.6.3 Community involvement in urban planning activities	Level of involvement of users in urban planning	Creation by the Métropolis and the City of Lyon in 2004 of the Mission Gerland located avenue Jean Jaurès Lyon 7th, in order to set up a global project of development of the district of Gerland, with for role the preparation of the strategic decisions, the cofinancing of the different operations, the information of the actors and the inhabitants of the district (in charge of consultation for the constitution and animation of the network of actors: Mr. Joseph Salamon) Mission Gerland (City of Lyon and Metropolis): - Realization of a public exhibition located in the Mission Gerland avenue Jean-Jaurès. - Involvement of schools: internships for teachers, visits to the district, inter-school competition on the urban project ... - Establishment of a monitoring group by local life pole (five centers in Gerland for as many sub-districts), with the support of the District Council. Realization by the SERL of the "newsletter of the Good Lait-Gerland project" for the inhabitants, posted on their website: http://www.serl.fr/References/ZAC-du-Bon- Milk - Newsletter n ° 1 of Autumn 2006, which presented the device of the public consultation, the first islands, the schedule of work by the calendar - Intermediate newsletters - Newsletter n ° 4, of March 2010, on the news (equipment early childhood ...), the presentation of the plan of the public spaces and the new real estate programs - Newsletter n ° 5, of May 2011, on the news (environmental approach ...), interview of two inhabitants and the new real estate programs - Newsletter n ° 6, of June 2012, on the news (opening of the first trade ...) - brochure on the shops		3
TOTAL				34

c. SWOT analysis

Where are we now ?

A SWOT analysis is a study undertaken to identify its strengths, weaknesses, available opportunities, and possible threats. The analysis is based on a quadrant matrix, in which strengths and weaknesses (internal factors) are presented above the x-axis, and opportunities and threats (external factors) are presented below. Typically, strengths and opportunities (positive factors) are listed on the left of the y-axis, while weaknesses and threats (negative factors) are listed on the right.

STRENGTHS	WEAKNESSES
- Running costs energy for public buildings : a theme that is growing in strength - Total primary energy demand for building operations and Community involvement in urban planning activities : a global approach at the neighborhood level can create a group dynamic	- Conservation of land : there is no agricultural land into the area of ZAC Bon Lait - Water consumption in offices : this theme is not well developed in user awareness actions
OPPORTUNITIES	**THREATS**
- Interesting to have new ideas to develop renewable energies and efficient insulation levels - Indoor air quality measurements : this theme is not yet part of the practices in the construction and renovation, but will become more prominent in the coming years	- Practices in construction and renovation do not take enough into account recycling and re-use for this indicators : > Solid waste from construction and demolition projects retained in the area for re-use or recycling > Consumption of non-renewable material resources for construction of infrastructure he new environmental regulation RE2020 will accelerate the consideration of these aspects in the practices - Ambient air quality with respect to particulates <10 mu (PM10) over a one year period It is difficult to influence the quality of the air in Lyon, which depends on transport and industries in the metropolis

4. STRATEGIC DEFINITION

a. Performance targets

“This paragraph is not relevant because our case study focuses on a retrofitting project that ended 5 years ago. Therefore, we have no information on the strategic definition and decision making process that may have occured at the time”

The overall Environmental, Social and Economic targets have to be described

Environmental targets	*Not relevant*
Social targets	*Not relevant*
Economy targets	*Not relevant*

Each partner must establish a target value for each criterion in the SNTool reflecting the overall targets..

A –			
Ax – Category name			
A1.7 – Conservation of land		Actual value	
(Indicator)	(Unit of measure)	Target value	
B –			
Bx – Category name			
Bx.x – Criterion name		Actual value	
(Indicator)	(Unit of measure)	Target value	
C –			
Cx – Category name			
Cx.x – Criterion name		Actual value	
(Indicator)	(Unit of measure)	Target value	
D –			
Dx – Category name			
Dx.x – Criterion name		Actual value	
(Indicator)	(Unit of measure)	Target value	
E –			
Ex – Category name			
Ex.x – Criterion name		Actual value	
(Indicator)	(Unit of measure)	Target value	
F –			
Fx – Category name			
Fx.x – Criterion name		Actual value	
(Indicator)	(Unit of measure)	Target value	
G –			
Gx – Category name			
Gx.x – Criterion name		Actual value	
(Indicator)	(Unit of measure)	Target value	

b. Constraints and restrictions

CONSTRAINTS / RESTRICTIONS	
Legal constraints	*Not relevant*
Technical constraints	*Not relevant*
Financial constraints	*Not relevant*
Environmental condition constraints	*Not relevant*
Stakeholder based restrictions	*Not relevant*
Other relevant constraints	*Not relevant*

5. DECISION MAKING

a. Description of scenarios

This paragraph is not relevant because our case study focuses on a retrofitting project that ended 5 years ago. Therefore, we ahve no information on the strategic definition and decision making process that may have occured at the time

NAME OF SCENARIO	DESCRIPTION
1. (i.e. Renewable Energy Synergy grid with central storage)	*Not relevant*
2. (i.e. Local cogeneration and envelope retrofit)	*Not relevant*
3.	*Not relevant*

b. Scenarios raking

i. Performance Scores

Not relevant

Issues	Current state	Scenario 1	Scenario 2	Scenario..
TOTAL SCORE				
A – Built Urban Systems				
B – Economy				
C – Energy				
D – Atmospheric				
E – Non-renewable sources				
F - Environment				
G – Social aspects				

ii. Key Performance Indicators

Not relevant

SCENARIO A			
KPI	**Indicator**	**Unit of measure**	**Value**
A 1.7 Conservation of Land	The total area of undeveloped land considered to be of value for ecological or agricultural purposes by relevant authorities,	%	

	as a percent of the total local area		
B.3.3 Running costs energy for public buildings	Running cost of energy aggregated	Euro/m^2/year	
C.1.1 Total final thermal energy consumption for building operations	Aggregated annual total final thermal energy consumption / gross floor area of all buildings	kWh/m^2/year	
C.1.4 Total final electric energy consumption for building operations	Aggregated annual total final electric energy consumption / Total gross floor area of all buildings	kWh/m^2/year	
C.1.7 Total primary energy demand for building operations	Buildings total primary energy consumption / local minimum value	%	
C.2.1 Share of thermal energy generation from on-site renewable sources on final thermal energy	Share of renewable thermal energy in final thermal energy consumptions	%	
C.2.X Share of electric energy generation from on-site renewable sources on final electric energy	Share of renewable electric energy in final electric energy consumptions	%	
C.2.4 Share of renewable energy on-site, on total primary energy consumptions for buildings operation	Share of renewable energy in primary energy consumptions	%	
D.1.2 Total GHG Emissions from primary energy used in building operations	CO_2 equivalent emissions per useful internal floor area per year	kg CO_2 eq./m2/yr	
E.1.6 Consumption of potable water for residential population	Water consumption per occupant	m^3 per occupant*yr	
E.1.7 Consumption of potable water for non-residential building systems	Water consumption per occupant	m^3 per occupant*yr	
E.2.3 Solid waste from construction and demolition projects retained in the area for re-use or recycling	Volume of materials that may be re-used or recycled from the local area on the total solid waste from construction and demolition projects	%	
E.3.2 Consumption of non-renewable material resources for construction of infrastructure	Quantity of materials from non-renewable material resources for construction or renovation of infrastructures in the local area over a 5-year period	Tonnes/ 1000 m2	
F.1.3 Recharge of groundwater through permeable paving or landscaping	Permeable area / total area	%	
F.2.3 Ambient air quality with respect to particulates <10 mu (PM10) over a one year period	Number of days exceeding the daily limits in a year	n	
G.2.1 Performance of the public transport	Percentage of inhabitants that are within 400 meters walking distance of at least one public transportation service stop.	%	
G.2.4 Quality of pedestrian and bycicle network	Total walkway kilometers of dedicated pedestrian paths and kilometers of bicycle path per 1.000 inhabitants.	Km/1000 inhabitants	
G.4.2 Availability and proximity of key services	Percentage of inhabitants that are within 800 meters walking distance of at least 3 key public services	%	
G.6.3 Community involvement in urbn planning activities	Level of involvement of users in urban planning	-	

SCENARIO B			
KPI	**Indicator**	**Unit of measure**	**Value**
A 1.7 Conservation of Land	The total area of undeveloped land considered to be of value for ecological or agricultural purposes by relevant authorities, as a percent of the total local area	%	
B.3.3 Running costs energy for public buildings	Running cost of energy aggregated	Euro/m^2/year	
C.1.1 Total final thermal energy consumption for building operations	Aggregated annual total final thermal energy consumption / gross floor area of all buildings	kWh/m^2/year	
C.1.4 Total final electric energy consumption for building operations	Aggregated annual total final electric energy consumption / Total gross floor area of all buildings	kWh/m^2/year	
C.1.7 Total primary energy demand for building operations	Buildings total primary energy consumption / local minimum value	%	
C.2.1 Share of thermal energy generation from on-site renewable sources on final thermal energy	Share of renewable thermal energy in final thermal energy consumptions	%	
C.2.X Share of electric energy generation from on-site renewable sources on final electric energy	Share of renewable electric energy in final electric energy consumptions	%	
C.2.4 Share of renewable energy on-site, on total primary energy consumptions for buildings operation	Share of renewable energy in primary energy consumptions	%	
D.1.2 Total GHG Emissions from primary energy used in building operations	CO_2 equivalent emissions per useful internal floor area per year	kg CO_2 eq./m2/yr	
E.1.6 Consumption of potable water for residential population	Water consumption per occupant	m^3 per occupant*yr	
E.1.7 Consumption of potable water for non-residential building systems	Water consumption per occupant	m^3 per occupant*yr	
E.2.3 Solid waste from construction and demolition projects retained in the area for re-use or recycling	Volume of materials that may be re-used or recycled from the local area on the total solid waste from construction and demolition projects	%	
E.3.2 Consumption of non-renewable material resources for construction of infrastructure	Quantity of materials from non-renewable material resources for construction or renovation of infrastructures in the local area over a 5-year period	Tonnes/ 1000 m2	
F.1.3 Recharge of groundwater through permeable paving or landscaping	Permeable area / total area	%	
F.2.3 Ambient air quality with respect to particulates <10 mu (PM10) over a one year period	Number of days exceeding the daily limits in a year	n	
G.2.1 Performance of the public transport	Percentage of inhabitants that are within 400 meters walking distance of at least one public transportation service stop.	%	
G.2.4 Quality of pedestrian and bycicle network	Total walkway kilometers of dedicated pedestrian paths and kilometers of bicycle path per 1.000 inhabitants.	Km/1000 inhabitants	

G.4.2 Availability and proximity of key services	Percentage of inhabitants that are within 800 meters walking distance of at least 3 key public services	%	
G.6.3 Community involvement in urbn planning activities	Level of involvement of users in urban planning	-	

iii. Financing mechanisms evaluation

Scenario A	*Not relevant*
Scenario B	*Not relevant*
Scenario ….	*Not relevant*

6. RETROFIT CONCEPT

This paragraph is not relevant because our case study focuses on a retrofitting project that ended 5 years ago. Therefore, we ahve no information on the strategic definition and decision making process that may have occured at the time

SELECTED SCENARIO	DESCRIPTION
A. (i.e. Renewable Energy Synergy grid with central storage)	*Not relevant*

KEY ELEMENTS OF THE CONCEPT

Retrofits Strategies	Aspect 1
	Aspect 2
	Aspect 3
Performance improvement	Environment
	Society
	Economy
Financial mechanism	Aspect 1
	Aspect 2
	Aspect 3

BUILDING SCALE ASSESSMENT – BUILDING 1

1. INITIATION

General information on the selected building	
Building GALLIUM	
Address	*ZAC Bon Lait, ilot A5C, Allée Léopold Senghor, Lyon 7ème*
Building use	 Building with social housing and a nursery on the ground floor
Owner	*Social landlord : Grandlyon Habitat, https://www.grandlyonhabitat.fr/* *City (for the nursery) : Lyon*
Year of construction	*2010*
Building method	Concrete for housing / wood frame for the nursery on the ground floor
Number of levels above earth	R + 3 + Attic
Number of levels underground	*1*
Heating system	District heating (network on incinerator + fossil energies)
Cooling system	*No*
DHW system	District heating + solar thermal system
Ventilation system	VMC collective double-flow
Lighting system	*low consumption bulbs*
Average U value	*Ubât = 0,46 W/m².K*
Number of occupants	*115*
Hours of occupation per year	*8 760*

2. PREPARATION

a. SBTool structure

In this section it is described the structure of your CESBA MED SBTool.
Please, enter here the list of the criteria selected from the CESBA MED SBT Generic Framework.

A – SITE REGENERATION AND DEVELOPMENT, URBAN DESIGN AND INFRASTRUCTURE	
I	

B – ENERGY AND RESOURCES CONSUMPTION	
B1	**Total life cycle non-renewable energy**
B1.1	Primary energy demand
B.1.2	Delivered thermal energy demand
B.1.3	Delivered electric energy demand
B.1.5	Energy from renewable sources in total thermal energy consumption
B.1.6	Energy from renewable sources in total electric energy consumption
B.1.11	Embodied non-renewable primary energy
B3	**Use of Material**
B3.5	Recycled materials
B4	**Use of potable water, stormwater and greywater**
B4.5	**Potable water** consumption for indoor uses

C- ENVIRONMENTAL LOADINGS	
C1	**Greenhouse Gas Emissions**
C1.3	Global Warming potential
C3	**Solid and Liquid Wastes**
C3.1	Construction and demolition waste
C3.2	Solid waste from building operation

D- INDOOR ENVIRONMENTAL QUALITY	
D1	**Indoor Air Quality and Ventilation**
D1.4	TVOC concentration in indoor air
D2	**Air Temperature and Relative humidity**
D.2.2	Thermal comfort index

E- SERVICE QUALITY
I

F- SOCIAL, CULTURAL AND PERCEPTUAL ASPECTS
/

G- COST AND ECONOMIC ASPECTS	
G1	**Cost and Economics**
G.1.4	*Use stage energy cost*
G.1.5	Use stage water cost

b. SBTool criteria selection rationale

In this section PPs must motivate the selection of the criteria that have been included in the regional CESBA MED SBTool. Why the criterion has been included? The reason could depend on regional policies or targets.

A - SITE REGENERATION AND DEVELOPMENT, URBAN DESIGN AND INFRASTRUCTURE	
CRITERION	**REASON/MOTIVATION**
/	

B – ENERGY AND RESOURCES CONSUMPTION	
CRITERION	**REASON/MOTIVATION**
B1.1 Primary energy demand	*KPI are mandatory; KPI were sufficient for local purposes*
B1.2 Delivered thermal energy demand	KPI are mandatory; KPI were sufficient for local purposes
B1.3 Delivered electric energy demand	KPI are mandatory; KPI were sufficient for local purposes
B1.5 Energy from renewable sources in total thermal energy consumption	KPI are mandatory; KPI were sufficient for local purposes
B1.6 Energy from renewable sources in total electric energy consumption	KPI are mandatory; KPI were sufficient for local purposes
B1.11 Embodied non-renewable primary energy	KPI are mandatory; KPI were sufficient for local purposes
B3.5 Recycled materials	KPI are mandatory; KPI were sufficient for local purposes
B4.5 Potable water consumption for indoor uses	KPI are mandatory; KPI were sufficient for local purposes

C- ENVIRONMENTAL LOADINGS	
CRITERION	**REASON/MOTIVATION**
C1.3 Global Warming potential	KPI are mandatory; KPI were sufficient for

	local purposes
C3.1 Construction and demolition waste	KPI are mandatory; KPI were sufficient for local purposes
C3.2 Solid waste from building operation	KPI are mandatory; KPI were sufficient for local purposes

D- INDOOR ENVIRONMENTAL QUALITY	
CRITERION	**REASON/MOTIVATION**
D1.4 TVOC concentration in indoor air	KPI are mandatory; KPI were sufficient for local purposes
D2.2 Thermal comfort index	KPI are mandatory; KPI were sufficient for local purposes

E- SERVICE QUALITY	
CRITERION	**REASON/MOTIVATION**
/	

F- SOCIAL, CULTURAL AND PERCEPTUAL ASPECTS	
CRITERION	**REASON/MOTIVATION**
/	

G- COST AND ECONOMIC ASPECTS	
CRITERION	**REASON/MOTIVATION**
G1.4 Use stage energy cost	KPI are mandatory; KPI were sufficient for local purposes
G1.5 Use stage water cost	KPI are mandatory; KPI were sufficient for local purposes

c. SBTool weights rationale

In this section PPs must motivate the value of weights assigned to the different issues, categories and criteria. Why the weight of a particular issue or criterion is higher (or lower)? Weights should reflect the regional political priorities.

ISSUE	WEIGHT (1 to 3)	MOTIVATION
A - SITE REGENERATION AND DEVELOPMENT, URBAN DESIGN AND INFRASTRUCTURE	**1**	Default values from CESBA MED PPs were relevant
B – ENERGY AND RESOURCES CONSUMPTION	3	Default values from CESBA MED PPs were relevant
C- ENVIRONMENTAL LOADINGS	3	Default values from CESBA MED PPs were relevant
D- INDOOR ENVIRONMENTAL QUALITY	2	Default values from CESBA MED PPs were relevant
E- SERVICE QUALITY	1	Default values from CESBA MED PPs were relevant
F- SOCIAL CULTURAL AND PERCEPTUAL ASPECTS	1	Default values from CESBA MED PPs were relevant
G- COST AND ECONOMIC ASPECTS	2	Default values from CESBA MED PPs were relevant

CATEGORIES	WEIGHT (%)
A1- Site regeneration and Development	0
A2- Urban design	0
A3- Project Infrastructure and Services	0
SUB TOTAL	0
B1- Total life cycle non renewable energy	60
B2- Embodied energy	0
B3- Use of materials	5
B4 – Use of water, stormwater and greywater	7
SUB TOTAL	72
C1- Greenhouse gas emissions	15
C2- Other atmospheric emissions	0
C3- Solid and liquid waste	10
C4- Impact on project site	0
C5- Other local and regional impacts	0
SUB TOTAL	25
D1- Indoor air quality and ventilation	1
D2- Thermal comfort	1
D3– Visual comfort	0
D4– Acoustic comfort	0

SUB TOTAL	2
E1- Safety and Security	0
E2- Functionality and efficiency	0
E3- Controllability	
E4– Flexibility and adaptability	0
E5- Optimization and maintenance of operating performance	
SUB TOTAL	0
F1- Social aspects	0
F2- Culture and heritage	0
F3- Perceptual	0
SUB TOTAL	0
G1- Cost and economics	2
SUB TOTAL	2
TOTAL	100

CRITERIA WEIGHTS

sheet WeightsA: B= Intensity of the Potential Effect (1-3), C=Extent of potential effect (1-5), D=Duration of potential effect (1-5)

CESBA MED SNTool, sheet WeightsB: LF = Local Factor

Not relevant

B- ENERGY AND RESOURCES CONSUMPTION						
B1- Total life cycle non-renewable energy						
CRITERION	**Weight (%)**	**B**	**C**	**D**	**L.F.**	**L.F. REASON/MOTIVATION**
B1.1 Primary energy demand	*10%*	*2*	*5*	*5*	*10%*	*Default values from CESBA MED PPs were relevant*
B1.2 Delivered thermal energy demand	*10%*	*2*	*5*	*5*	*10%*	*Default values from CESBA MED PPs were relevant*
B1.3 Delivered electric energy demand	*10%*	*2*	*5*	*5*	*10%*	*Default values from CESBA MED PPs were relevant*
B1.5 Energy from renewable sources in total thermal energy consumption	*10%*	*2*	*5*	*5*	*10%*	*Default values from CESBA MED PPs were relevant*
B1.6 Energy from renewable sources in total electric energy consumption	*10%*	*2*	*5*	*5*	*10%*	*Default values from CESBA MED PPs were relevant*
B1.11 Embodied non-renewable primary energy	*10%*	*2*	*5*	*5*	*10%*	*Default values from CESBA MED PPs were relevant*
B2- Electrical peak demand						
B3- Use of Material						
CRITERION	**Weight (%)**	**B**	**C**	**D**	**L.F.**	**L.F. REASON/MOTIVATION**
B3.5 Recycled	*5%*	*2*	*4*	*3*	*5%*	*Default values from CESBA MED PPs were relevant*

materials						
B4- Use of potable water, stormwater and greywater						
CRITERION	**Weight (%)**	**B**	**C**	**D**	**L.F.**	**L.F. REASON/MOTIVATION**
B4.5 Potable water consumption for indoor uses	7%	3	4	3		

C- ENVIRONMENTAL LOADINGS						
C1- Greenhouse Gas Emissions						
CRITERION	**Weight (%)**	**B**	**C**	**D**	**L.F.**	**L.F. REASON/MOTIVATION**
C1.3 Global Warming potential	*15%*	*3*	*5*	*5*	*15%*	*Default values from CESBA MED PPs were relevant*
C3 - Solid and Liquid Wastes						
CRITERION	**Weight (%)**	**B**	**C**	**D**	**L.F.**	**L.F. REASON/MOTIVATION**
C3.1 Construction and demolition waste	5%	2	4	3	5%	*Default values from CESBA MED PPs were relevant*
C3.2 Solid waste from building operation	5%	2	4	3	5%	*Default values from CESBA MED PPs were relevant*

D- INDOOR ENVIRONMENTAL QUALITY						
D1- Indoor Air Quality and Ventilation						
CRITERION	**Weight (%)**	**B**	**C**	**D**	**L.F.**	**L.F. REASON/MOTIVATION**
D1.4 TVOC concentration in indoor air	*1%*	3	*1*	*3*	*1%*	*Default values from CESBA MED PPs were relevant*
D2 - Air Temperature and Relative humidity						
CRITERION	**Weight (%)**	**B**	**C**	**D**	**L.F.**	**L.F. REASON/MOTIVATION**
D2.2 Thermal comfort index	*1%*	3	*1*	*3*	*1%*	*Default values from CESBA MED PPs were relevant*

G- COST AND ECONOMIC ASPECTS						
G1- Cost and Economics						
CRITERION	**Weight (%)**	**B**	**C**	**D**	**L.F.**	**L.F. REASON/MOTIVATION**
G1.4 Use stage energy cost	1%	3	2	3	1%	*Default values from CESBA MED PPs were relevant*
G1.5 Use stage water cost	*0.4%*	1	*2*	*3*	*0.4%*	*Default values from CESBA MED PPs were relevant*

d. SBTool benchmarks rationale

In this section PPs must motivate the value of benchmarks assigned to the different criteria for score zero (minimum acceptable performance) and for score 5 (excellent and ideal performance). The value of indicators corresponding to score zero is usually depends on regulations, standards or a typical performance in the region. Please keep in mind that score 3 represents a best practice performance. Score 5 is an excellent performance.

B- ENERGY AND RESOURCES CONSUMPTION				
CRITERION	INDICATOR	UNIT OF MEASURE	BENCHMARK	DERIVATIONS
B1.1 Primary energy demand	Primary energy demand per area per year	*kWh/m2/y*	*0: 140*	Result new collective dwellings RT2012
			3: 50	Mid value
			5 : 0	Result new collective dwellings RT2012
B1.2 Delivered thermal energy demand	*Delivered thermal energy demand per area per year*	*kWh/m2/y*	*0: 130*	Result new collective dwellings RT2012
			3: 45	Mid value
			5 : 30	Result new collective dwellings RT2012
B1.3 Delivered electric energy demand	Delivered electric energy demand per area per year	*kWh/m2/y*	*0: 140*	Result new collective dwellings RT2012
			3: 50	Mid value
			5 : 0	Result new collective dwellings RT2012
B1.4 Energy from renewable sources in total primary energy consumption	Primary energy demand of the building that is met by renewable sources on total primary energy demand	*%*	*0: 10*	*The minimum value given corresponds to the criteria given in the Greater Lyon Sustainable Habitat framework, which requires an active renewable energy production with a minimum*
			3: 80	high-performance building
			5 : 100	*Autonomous building*
B1.5 Energy from renewable sources in total thermal energy consumption	Share of renewable energy in final thermal energy consumptions	*%*	*0: 10*	The minimum value given corresponds to the criteria given in the Greater Lyon Sustainable Habitat framework, which requires an active renewable energy production with a minimum
			3: 80	High-performance building
			5 : 100	Autonomous building

B1.6 Energy from renewable sources in total electric energy consumption	*Share of renewable energy in final electric energy consumption*	*%*	*0: 10*	The minimum value given corresponds to the criteria given in the Greater Lyon Sustainable Habitat framework, which requires an active renewable energy production with a minimum
			3: 80	High-performance building
			5 : 100	Autonomous building for electricity
B1.11 Embodied non-renewable primary energy	*Embodied primary non-renewable energy*	*MJ/m2*	*0: 900*	Sources: CSTB report "Capitalization of the results of the HQE Performance experimentation, Statistical analysis, Action 22" of October 2013. 250kWhep/m²shon/an toute typologie confondue
			3: 630	*175 kWhep / m²shon / year any typology taken together*
			5 : 504	140 kWhep / m²shon / year any typology taken together
B3.5 Recycled materials	Weight of recycled materials on total weight of materials	*%*	*0: 5*	*Actual professional* practice
			3: 45	*objective of professional practice*
			5 : 75	objective of professional best practice
B4.5 Potable water consumption for indoor uses	*Water consumption per occupant per year*	*m3/occupant/year*	*0: 90*	Assumptions: for all dwellings, people present every day of the year, heavy use of all water uses, consumer equipment, over-occupancy - see Water Calculator tool - for 3121 m² SHAB, with 3 occupants per dwelling and 50 dwellings
			3: 30	*Water Calculator - 3121 m² SHAB, with 2.3 occupants per dwelling and 50 dwellings*
			5 : 20	Water Calculator - 3121 m² SHAB with 2.3 occupants per dwelling and 50 dwellings

C- ENVIRONMENTAL LOADINGS				
CRITERION	INDICATOR	UNIT OF MEASURE	BENCHMARK	DERIVATIONS

C1.3 Global Warming potential	*CO2 equivalent emissions per area per year*	*kg CO2 eq./m2/yr*	*0: 80*	Emissions from the regulatory calculation
			3: 10	Emissions from the regulatory calculation
			5: 5	Emissions from the regulatory calculation
C3.1 Construction and demolition waste	Weight of waste and materials generated per 1 m2 of useful floor area demolished or constructed	*kg/m2/life cycle stage*	*0: 1700*	Figures given in the CESBA protocol
			3: 1200	Figures given in the CESBA protocol
			5: 600	Figures given in the CESBA protocol
C3.2 Solid waste from building operation	*Ratio of the number of collectable solid waste types within a 100 m distance from the building's entrance to the reference solid waste categories*	%	*0: 0,4*	Criteria based on local practices in dense urban areas
			3: 0,7	Criteria based on local practices in dense urban areas
			5: 1	Criteria based on local practices in dense urban areas

D- INDOOR ENVIRONMENTAL QUALITY

CRITERION	INDICATOR	UNIT OF MEASURE	BENCHMARK	DERIVATIONS
D1.4 TVOC concentration in indoor air	TVOC concentration in indoor air	µg/ m3	*0: 300*	Recommendation of German Federal Agency
			3: 200	*Local value*
			5 : 100	*Local objective*
D2.2 Thermal comfort index	Predicted Percentage Dissatisfied	*%*	0: 10	CESBA Default value
			3: 5	Mid Value
			5 : 0	Good quality

G- COST AND ECONOMIC ASPECTS

CRITERION	INDICATOR	UNIT OF MEASURE	BENCHMARK	DERIVATIONS
G1.4 Use stage energy cost	Energy annual cost per usable floor area	€/m2/yr	*0: 15*	*Hypothesis: Collective building, cep <96 kWhep / m².year, collective gas boiler*
			3: 7	*Hypothesis: Collective building with efficient thermal envelope, collective gas boiler*
			5: 5	*Hypothesis: Collective building with high performance thermal envelope, collective gas boiler*

G1.5 Use stage water cost	Water annual cost per usable floor area	€/m2/yr	*0: 13*	*Assumptions: for all dwellings, people present every day of the year, strong use of all water uses, consumer equipment, - see Water Calculator tool - 90 m3 / occupant / year, for 3121 m² SHAB, with 3 occupants per dwelling and 50 dwellings*
			3: 3,5	*Water Calculator - 30 m3 / occupant / year, for 3121 m² SHAB, with 2.3 occupants per dwelling and 50 dwellings*
			5: 2,3	*Water Calculator - 20 m3 / occupant / year, for 3121 m² SHAB, with 2.3 occupants per dwelling and 50 dwellings*

e. SBTool Criteria Specifications

In this section PPs must indicate for each selected criterion:

- *Information source: The source of the data/information that will be used to characterize the value of the indicator. Example: monitored data, measured data, statistic data, models and simulation, studies, data banks, etc.*
- *Assessment method: Short and concise description of the assessment method used to verify the value of indicators. Example: calculation steps, data analysis process, monitoring procedure, content of a study, use of statistic data, etc.*
- *Standards: technical documents taken as reference for the assessment method.*

B- ENERGY AND RESOURCES CONSUMPTION			
CRITERION	**INDICATOR**	**SPECIFICATIONS**	
B1.1 Primary energy demand	Primary energy demand per area per year	*Information source*	*Models and simulation*
		Assessment method	*The calculation methods for each sub-indicator are given by the CEN standards that support the implementation of the Directive on the Energy Performance of Buildings (EPBD) in the European Union. The CEN standards that form the basis of the calculation methods of most national regulations are: EN 15603 (Energy performance of buildings. Overall energy consumption and definition of energy assessments) and EN ISO 52000 (Energy performance of buildings - Calculation of energy requirements for space heating and cooling). In fact, the national calculation methods used to produce the energy performance certificates can be used here. Interior lighting is not always covered by national regulations. As a result, the evaluator must clearly mention in his report that the consumptions were discarded or detail the specific method used. The reference standard for the evaluation of lighting consumption must be EN 15193. References and standards Level (s) EN 52000 (Energy performance of buildings: overall energy consumption and definition of energy assessments).*
		Standard	*The reference standard for the evaluation of lighting consumption must be EN 15193. References and standards Level (s) EN 52000 (Energy performance of buildings: overall energy consumption and definition of energy assessments). EN 52016-1*
B1.2 Delivered	Delivered thermal	*Information source*	*Models and simulation*

thermal energy demand	energy demand per year	*Assessment method*	*The calculation method for this indicator is given by the CEN standards that support the implementation of the Directive on the energy performance of buildings (EPBD) in the European Union.* *The CEN standards that form the basis of the calculation methods of most national regulations are: EN 52000 (Energy performance of buildings.* *Overall energy consumption and definition of energy assessments) and EN ISO 56001 (Energy performance of buildings - Calculation of energy requirements for space heating and cooling). In fact, the national calculation methods used to produce the energy performance certificates can be used here.*
		Standard	*Level (s)* *EN 52000 (Energy performance of buildings.* *Overall energy consumption and definition of energy assessments) and EN ISO 56001 (Energy performance of buildings - Calculation of energy requirements for space heating and cooling). In fact, the national calculation methods used to produce the energy performance certificates can be used here.*
B1.3 Delivered electric energy demand	Delivered electric energy demand per area per year	*Information source*	*Models and simulation*
		Assessment method	*The calculation method for this indicator is given by the CEN standards that support the implementation of the Directive on the energy performance of buildings (EPBD) in the European Union.* *The CEN standards which form the basis of the calculation methods of most national regulations are: EN 52000 (Energy performance of buildings. Overall energy consumption and definition of energy assessments) and EN ISO 56001 (Energy performance of buildings - Calculation of energy requirements for space heating and cooling). In fact, the national calculation methods used to produce the energy performance certificates can be used here.* *In the case of existing buildings, the electrical energy delivered must be evaluated preferentially from the data collected.*
		Standard	*EN 52000 (Energy performance of buildings.* *Overall energy consumption and definition of energy assessments) and EN ISO 56001 (Energy performance of buildings - Calculation of energy requirements for space heating and cooling)*
B1.4 Energy from renewable sources in total primary energy consumption	Primary energy demand of the building that is met by renewable sources on total primary energy demand	*Information source*	*Models and simulation*
		Assessment method	*The calculation method for this indicator is given by the CEN standards that support the implementation of the Directive on the Energy Performance of Buildings (EPBD) in the European Union.* *The CEN standards which form the basis of the calculation methods of most national regulations*

			are: EN 52000 (Energy performance of buildings. *Overall energy consumption and definition of energy assessments) and EN ISO 56001 (Energy performance of buildings - Calculation of energy requirements for space heating and cooling).*
		Standard	*EN 52000 (Energy performance of buildings: overall energy consumption and definition of energy assessments)*
B1.5 Energy from renewable sources in total thermal energy consumption	Share of renewable energy in final thermal energy consumptions	*Information source*	*Models and simulation*
		Assessment method	*The calculation method for this indicator is given by the CEN standards which support the implementation of the Directive on the energy performance of buildings.*
		Standard	*EN 52000 (Energy performance of buildings: overall energy consumption and definition of energy assessments*
B1.6 Energy from renewable sources in total electric energy consumption	*Share of renewable energy in final electric energy consumption*	*Information source*	*Models and simulation*
		Assessment method	*The calculation method for this indicator is given by the CEN standards which support the implementation of the Directive on the energy performance of buildings.* *In the case of existing buildings, the share of renewable energy in total electricity consumption should be assessed from measurements.* *References and standards*
		Standard	*EN 52000 (Energy performance of buildings: overall energy consumption and definition of energy assessments*
B1.11 Embodied non-renewable primary energy	*Embodied primary non-renewable energy*	*Information source*	*Models and simulation*
		Assessment method	*The main reference standards for this indicator are ISO 14040/44, EN 15804 (Contribution of construction works to sustainable development - Environmental product declarations - Rules governing categories of construction products) and EN 1578 (Contribution of construction works to sustainable development - Evaluation of the environmental performance of buildings - Calculation method). The calculation of this indicator is based on the inventory of the different materials that make up the building (enkg), the nomenclature of material surveys. The document lists the quantities of different materials by type of constructive elements. The starting point is the DQE, estimated quantitative detail, which details the various elements of the project (foundations, columns ...). The nomenclature of material records describes the different materials that make up the elements of the building. Once the material survey has been completed, the indicator can be calculated. The different stages of the calculation are the following:* *-Compiling the masses of different materials;*

			this compilation work must be at least 99% of the total mass of the building; *-Identify the different elements of the buildings. A decomposition by material must be carried out. And the mass of each of the materials estimated:* *- Aggregate by material: the masses by type of elements must be added so as to obtain the total mass per material.Once the nomenclature of the material surveys carried out, it is possible to calculate the indicator by associating each material (in kg) with the corresponding gray energy factor (in MJ / kg).* *The total value of gray energy of non-renewable origin is then reported to the surface.*
		Standard	*EN 15978 (Contribution of construction works to sustainable development - Evaluation of the environmental performance of buildings - Calculation method)*
B3.5 Recycled materials	Weight of recycled materials on total weight of materials	*Information source*	*Models and simulation or material documents*
		Assessment method	*To calculate the value of the indicator it is necessary to compile a Bill of Materials (BoM) that is a mass-based inventory of the different materials (kg) that compose a building. The BoM is organised according to main elements that a building is composed of.* *The starting point is the Bill of Quantities (BoQ) that specifies the elements of a building (e.g. foundations, columns). The BoQ comprises different categories of elements, which can have different functional performance characteristics. A BoM differs from a BoQ in that it describes the different materials (e.g. wood, steel, aluminium) that are contained in the various building elements. Once the BoM has been compiled, it is possible to calculate the value of the indicator. The following steps should be followed in order to characterize the indicator:* *- Compile the Bill of Quantities: A BoQ is compiled which comprises the building elements accounting for at least 99% of the mass of the building.* *- Identify the basic composition of each building element. A breakdown of its constituent materials has to elaborated. The mass of each constituent material has to be estimated;* *- Aggregation by material: the mass of all constituent material should thereafter be aggregated to obtain the total mass of materials used in the building (A);* *- Identify the recycled content of each constituent material (in mass);* *- Aggregation by material: the recycled mass of all constituent materials should thereafter be aggregated to obtain the total recycled mass of materials (B) used in the building;* *- The indicator's value is calculated as B/A (total mass of recycled materials on the total mass of materials).*
		Standard	*/*

		Information source	*Models and simulation*
B4.5 Potable water consumption for indoor uses	*Water consumption per occupant per year*	*Assessment method*	*The evaluator should include sanitary equipment (ie toilets, taps and showers) that consume water (ie dishwashers, washing machines). The unit consumptions of the different devices are determined from the industrial data. The specific factors of use must be established, as well as the number of days of occupation per year. The principle of calculating the consumption per occupant for faucets and showers is as follows: Total consumption (L / n of day of occ.) =? Unit consumption (L / min) x utilization factor x (min / nb of day of occ.) The calculation is the same for the consumptions related to the use of the toilets (the flushes replace the minutes). For hygiene, the bases of calculation are as follows: Total consumption (L / year) = unit consumption (L / m²) area (m2) × annual washing number (year - 1) Total consumption (m3 / occupant.year) = total consumption (L / year) x 0.001 (m3 / L) + occupancy time (occupant) Non-potable water consumption must be specified (eg reclaimed water used for In the case of existing buildings, the indicator should be calculated from measured data. The measured consumption must be averaged over a period of 3 years.*
		Standard	Tool "Water calculator"

C- ENVIRONMENTAL LOADINGS			
CRITERION	**INDICATOR**	**SPECIFICATIONS**	
C1.3 Global Warming potential	*CO2 equivalent emissions per area per year*	*Information source*	*Models and simulation*
		Assessment method	*Calculation of CO2eq emissions. for each building can be realized thanks to this formula: E = [Σ (Qfuel, i x LHVi × Kem, i) + (Qel × Kem, el) + (Qdh × Kem, dh)] / SuQfuel, I = annual quantity of i-th fuel (m3 or kg) Qel = annual quantity of electricity from the grid (kWh) Qdh = annual amount of energy from the district heating or cooling network (kWh) LHVi = lower calorific value of i-th fuel (kWh / m3 or kWh / kg) Kem, i = CO2 emission factor eq. i-th fuel (kg CO2 / kWh) Kem, el = CO2 emission factor eq. electrical energy from the grid (kg CO2 / kWh) Kem, dh = CO2 emission factor eq. of the urban heat or cold network (kg CO2 / kWh) Su = total usable area of buildings*

		Standard	*EN 52000 (Energy performance of buildings: overall energy consumption and definition of energy assessments)*
C3.1 Construction and demolition waste	Weight of waste and materials generated per 1 m2 of useful floor area demolished or constructed	*Information source*	*Models and simulation*
		Assessment method	*1. Design phase (based on estimates): Estimates based on surveys of existing buildings that will undergo a major renovation or whose structure will be reused (life cycle stage B5). Estimates based on building deconstruction and demolition scenarios beyond the end of building use (life cycle stages C1 / 3, D).* *2. Construction (based on data collected on site): Data of deconstruction and demolition of a building to make room for a new construction (as part of the life cycle stages) .Data of partial deconstruction of a building for on-site reuse. On-site construction data for a new building and / or prefabrication / construction of some off-site elements (Life Cycle Steps A3 / 5)* *3. Completion (based on estimates supported by compliant plans): Estimates based on deconstruction and demolition scenarios of the building beyond the end of use of the building (life cycle stages C1 / 3, D)* *4 Post-delivery (based on commissioning and testing)* *5. Occupation (based on measured performance)* *6.End of life (based on the envisaged performance): Details the measures taken in the design phase to facilitate the construction, reuse and recycling (stages of the C1 / 3, D life cycle).*
		Standard	*/*
C3.2 Solid waste from building operation	*Ratio of the number of collectable solid waste types within a 100 m distance from the building's entrance to the reference solid waste categories*	*Information source*	*Plans of the area with the location of containers*
		Assessment method	*The seven solid waste reference categories are:* *-Paper* *-Plastic* *-Metal* *-Glass* *-Wet waste* *-Textiles* *-Dangerous* *Identify the availability and location of dedicated containers for each of the 7 categories of solid waste. Calculate the walking distance (m) of the main building door for each sorting equipment. Evaluate which of the 7 categories of solid waste can be collected within a 50m perimeter from the main entrance of the building (A) .The value of the indicator is given by the ratio: A / 7*
		Standard	*/*

D- INDOOR ENVIRONMENTAL QUALITY			
CRITERION	**INDICATOR**	**SPECIFICATIONS**	
D1.4 TVOC concentration in indoor air	TVOC concentration in indoor air	*Information source*	*Measured data*
		Assessment method	*The value of the indicator must be given by measurements in situ in occupancy (and after delivery). Measurements must be carried out on at least 10% of the apartments. These must be representative of the different types of housing, configurations and materials used. The samples must be taken from the living room and the smallest room of each apartment. The measuring equipment must be placed in the center of the room so as not to be too much influenced by the doors and windows and the air inlets.* *The sampling method shall be in accordance with ISO 16000-6 (Indoor Air - Part 6: Determination of Volatile Organic Compounds in Indoor Air and Active Sampling Chambers on Tenax TA (R) Sorbent, Desorption thermal and gas chromatographic using MS or MS / FID) or equivalent.* *In the design phase, product testing can be used as a simplified data source. These emissions must be evaluated over a period of 28 days. They must be established in accordance with standard NF EN 16516 (Construction products - evaluation of the emission of dangerous substances - Determination of indoor air emissions).* *Test data is then required from the manufacturers and suppliers of the products concerned. All tests must be on compliant finished products.* *References and Standards EN 15251 (Indoor Environment Criteria for the Design and Evaluation of the Energy Performance of Buildings covering Indoor Air Quality, Thermal, Lighting and Acoustics)* *Resources:* *VOC and housing (up to 35 substances): "In the gas phase, the chemical compounds present are mainly Volatile Organic Compounds (VOCs) containing a multitude of substances of different chemical families, and are thus detected in the indoor environments in a more significant way than some aldehydes (including formaldehyde mainly and almost systematically), certain aromatic hydrocarbons including benzene, toluene, ethylbenzene and xylenes commonly called BTEX, but also VOCs belonging to the families of terpenes, ketones, alcohols, ethers of Glycol ... "For information, the United States recommends a total VOC concentration of less than 200 µg / m3 as the comfort threshold and Germany recommends a target value of 300 µg / m3. measures of_19 "Air Atmo Alsacehttp: //www.atmo-*

			alsace.net/medias/products/Campagne_de_measures_de_19.pdf
		Standard	*ISO 16000-6 (Indoor Air - Part 6: Determination of Volatile Organic Compounds in Indoor Air and Active Sampling Chambers on Tenax TA (R) Sorbent, Desorption thermal and gas chromatographic using MS or MS / FID) or equivalent.* *NF EN 16516 (Construction products - evaluation of the emission of dangerous substances - Determination of indoor air emissions).*
D2.2 Thermal comfort index	Predicted Percentage Dissatisfied	*Information source*	*Models and simulation or measured method*
		Assessment method	*In the design phase, PPD estimation can be done using simulation software. In the operation phase, the PPD can be measured.* *The value of the PPD shall be calculated or measured in accordance with EN 7730 (Ergonomics of the thermal environment - Analytical determination and interpretation of thermal comfort by calculation of the PMV and PPD indices and by local thermal comfort criteria) for the seasonal and winter conditions. The PDP must be evaluated in all main living rooms and bedrooms. In the case of a collective dwelling, each configuration and orientation must be evaluated.* *The measuring point should be placed one meter from the center of the main window of each room. The following parameters must be used to characterize the value of the PDP:* *-clothing thermal resistance (clo) = 0.5-metabolic energy (met) = 1.2* *To evaluate the value of the PDP on a building as a whole, the PPD values estimated or measured in each room must be aggregated by a weighted average: PPDm = Sum PPDi x Au, i / Sum Au, where:* *PPDi = PPD for the coin-th* *Au, i = useful area of the i-th room*
		Standard	*EN 7730 (Ergonomics of the thermal environment - Analytical determination and interpretation of thermal comfort by calculation of the PMV and PPD indices and by local thermal comfort criteria*

G- COST AND ECONOMIC ASPECTS

CRITERION	INDICATOR	SPECIFICATIONS	
G1.4 Use stage energy cost	Energy annual cost per usable floor area	*Information source*	*Models and simulation*
		Assessment method	*The calculation can be based on estimates in the design phase. It must be based on consumption monitoring during the exploitation phase. The indicator can be used by different*

			actors for different purposes. In the design phase, it can be used to estimate future operating costs. In the operating phase, it can be used to compare the real performance of the building with the estimated estimates. For existing buildings, the total annual cost of thermal and electrical consumption from energy bills must be realized over an average of 3 years.
		Standard	*/*
G1.5 Use stage water cost	Water annual cost per usable floor area	*Information source*	*Models and simulation*
		Assessment method	*The calculation can be based on estimates in the design phase. It must be based on consumption monitoring during the operation phase. The indicator can be used by different actors for different purposes. In the design phase, it can be used to estimate future operating costs. In the operation phase, it can be used to compare the real performance of the building with the estimated estimates.* *For existing buildings, the total annual cost of water consumption from the invoices must be realized over an average of 3 years.*
		Standard	*/*

3. DIAGNOSIS

a. Performance scores

Evaluation of the actual performance and relative level of sustainability of the Building. PPs have to indicate the scores reached.

Same scores as the results in the following table

	SCORE
A - SITE REGENERATION AND DEVELOPMENT, URBAN DESIGN AND INFRASTRUCTURE	Same scores as the results in the following table
B – ENERGY AND RESOURCES CONSUMPTION	
B1 – Total life cycle non-renewable energy	
B1.1 – Primary energy demand	3
B1.2 - Delivered thermal energy demand	
B1.3 - Delivered electric energy demand	
B1.4 - Energy from renewable sources in total primary energy consumption	
B1.5 - Energy from renewable sources in total thermal energy consumption	
B1.6 - Energy from renewable sources in total electric energy consumption	
B1.11 – Embodied non-renewable primary energy	
B3 - Use of Material	
B4.5 – Potable water consumption for indoor uses	
C- ENVIRONMENTAL LOADINGS	
C1 – Greenhouse Gas Emissions	
C1.3 – Global Warming potential	
C3 - Solid and Liquid Wastes	
C3.1 - Construction and demolition waste	
C3.2 - Solid waste from building operation	
D- INDOOR ENVIRONMENTAL QUALITY	
D1 – Indoor Air Quality and Ventilation	
D1.4 - TVOC concentration in indoor air	
D2 – Air Temperature and Relative humidity	
D2.2 - Thermal comfort index	
G- COST AND ECONOMIC ASPECTS	
G1 – Cost and Economics	
G1.4 – Use stage energy cost	
G1.5 - Use stage water cost	

b. Key Performance Indicators value

KPI	Indicator	Unit of measure	Value	Score
B.1.1 Primary energy demand (in use stage)	Annual primary energy demand per useful internal floor area	kWh/m2/yr	47,5	3

B.1.2 Delivered thermal energy demand (in use stage)	Annual delivered thermal energy demand per useful internal floor area	kWh/m2/yr	36,5	3
B.1.3 Delivered electric energy demand (in use stage)	Annual delivered electric demand per useful internal floor area	kWh/m2/yr	23,3	3
B.1.4 Energy from renewable sources in total primary energy consumption	Primary energy demand of the building that is met by renewable sources on total primary energy demand	%	20	3
B.1.5 Energy from renewable sources in total final thermal energy consumption	Share of renewable energy in final thermal energy consumptions	%	43	0
B.1.6 Energy from renewable sources in total final electric energy consumption	Share of renewable energy in final electric energy consumptions	%	0	-1
B.1.11 Embodied non-renewable primary energy	Embodied primary non-renewable energy per area	MJ/m2	No data - not recoverable a posteriori	
B.3.5 Recycled materials	Weight of recycled materials on total weight of materials.	%	No data - not recoverable a posteriori	
B.4.2 Water consumption for indoor uses (in use stage)	Water consumption per occupant per year	m^3 of water per ccupant per year	30	3
C.1.3 Greenhouse Gas Emissions (in use stage)	CO_2 equivalent emissions per useful internal floor area per year	kg CO_2 eq./m2/yr	4,58	5
C.3.1 Construction and demolition waste	Weight of waste and materials generated per 1 m^2 of useful floor area demolished or constructed	kg/m^2/life cycle stage	No data - not recoverable a posteriori	
C.3.2 Solid waste from building operation	Ratio between the number of collectable solid waste types in a 50 meters distance from the building's entrance and the reference solid waste categories.	n	0,42	0
D.1.4 VOC concentration in indoor air	VOC concentration in indoor air	µg per cube meter	No data - not recoverable a posteriori	
D.2.2 Thermal comfort index	Predicted Mean Vote	-	No data - not recoverable a posteriori	
G.1.4 Use stage energy cost	Energy annual cost per	€/m2/yr	10	0

	usable floor a			
G.1.5 Use stage water cost	Water annual cost per usable floor area	€/m2/yr	3,5	3
TOTAL				25

c. Actual performance analysis

WEAKNESSES ASPECTS	*Practices in construction and renovation do not take enough into account Forlmandeyde concentration, VOC concentration in indoor air and CO2 concentration in indoor air; it will become more prominent in the coming years with the new regulation in 2020* *Use stage water cost : it is difficult to provide water consumption targets while they depend on users and the use of a building may vary (occupation, destination ...)*
STRENGHT ASPECTS	*Primary energy demand (in use stage) : a theme that is growing in strength* *Renewable energies : Interesting to have new ideas to develop renewable energies and efficient systems*
POTENTIAL FOR PERFORMANCE IMPROVEMENT	*B.3.5 Recycled materials, B.2.1 Embodied non-renewable primary energy, Construction and demolition waste : thess theme are not yet part of the practices in the construction and renovation, but will become more prominent in the coming years with the new regulation in 2020*

4. STRATEGIC DEFINITION

a. Performance targets

"This paragraph is not relevant because our case study focuses on a retrofitting project that ended 5 years ago. Therefore, we have no information on the strategic definition and decision making process that may have occured at the time"

Each partner must establish a target value for each criterion in the SBTool.

The target values have to reflect the global Environmental, Social and Economic targets established at urban level.

A - SITE REGENERATION AND DEVELOPMENT, URBAN DESIGN AND INFRASTRUCTURE			
Ax – Category name			
Ax.x – Criterion name		Actual value	Not relevant
nt	(Unit of measure)	Target value	
B – ENERGY AND RESOURCES CONSUMPTION			
Bx – Category name			
Bx.x – Criterion name		Actual value	
(Indicator)	(Unit of measure)	Target value	
C- ENVIRONMENTAL LOADINGS			
Cx – Category name			
Cx.x – Criterion name		Actual value	
(Indicator)	(Unit of measure)	Target value	
D- INDOOR ENVIRONMENTAL QUALITY			
Dx – Category name			
Dx.x – Criterion name		Actual value	
(Indicator)	(Unit of measure)	Target value	
E- SERVICE QUALITY			
Ex – Category name			
Ex.x – Criterion name		Actual value	
(Indicator)	(Unit of measure)	Target value	
F- SOCIAL CULTURAL AND PERCEPTUAL ASPECTS			
Fx – Category name			
Fx.x – Criterion name		Actual value	
(Indicator)	(Unit of measure)	Target value	
G- COST AND ECONOMIC ASPECTS			
Gx – Category name			
Gx.x – Criterion name		Actual value	
(Indicator)	(Unit of measure)	Target value	

b. Constraints and restrictions

CONSTRAINTS / RESTRICTIONS

Legal constraints	*Not relevant*
Technical constraints	*Not relevant*
Financial constraints	*Not relevant*
Environmental condition constraints	*Not relevant*
Stakeholder based restrictions	*Not relevant*
Other relevant constraints	*Not relevant*

c. Potential strategies at urban scale

Synergy zones	
Energetic synergies	*Not relevant*
Water synergies	*Not relevant*
Waste synergies	*Not relevant*
Mobility synergies	*Not relevant*
Other synergies	

5. DECISION MAKING

a. Description of scenarios

“This paragraph is not relevant because our case study focuses on a retrofitting project that ended 5 years ago. Therefore, we have no information on the strategic definition and decision making process that may have occured at the time”

NAME OF SCENARIO	DESCRIPTION
1. (i.e. Windows replacement, outdoor thermal insulation)	Not relevant
2. (i.e. Heat pump and solar panels)	Description (1500 words)
3.	Description (1500 words)

b. Scenarios raking

i. Performance Scores

Not relevant

Issues	Current state	Scenario 1	Scenario 2	Scenario..
TOTAL SCORE				
A – Site regeneration				
B – Energy and Resources C.				
C – Environmental Loadings				
D – Indoor Env. Quality				
E – Service Quality				
F – Social Aspects				
G – Cost and Economic Asp.				

ii. Key Performance Indicators

Not relevant

SCENARIO A			
KPI	**Indicator**	**Unit of measure**	**Value**
B.1.1 Primary energy demand (in use stage)	Annual primary energy demand per useful internal floor area	kWh/m2/yr	Not relevant
B.1.2 Delivered thermal energy demand (in use stage)	Annual delivered thermal energy demand per useful internal floor area	kWh/m2/yr	
B.1.3 Delivered electric energy demand (in use stage)	Annual delivered electric demand per useful internal floor area	kWh/m2/yr	
B.1.4 Energy from renewable sources in total primary energy consumption	Primary energy demand of the building that is met by renewable sources on total primary energy demand	%	Calculation
B.1.5 Energy from renewable sources in total final thermal energy consumption	Share of renewable energy in final thermal energy consumptions	%	
B.1.6 Energy from renewable sources in total final electric energy consumption	Share of renewable energy in final electric energy consumptions	%	
B.1.11 Embodied non-renewable primary energy	Embodied primary non-renewable energy per area	MJ/m2	
B.3.5 Recycled materials	Weight of recycled materials on total weight of materials.	%	
B.4.2 Water consumption for indoor uses (in use stage)	Water consumption per occupant per year	m^3 of water per occupant per year	
C.1.3 Greenhouse Gas Emissions (in use stage)	CO_2 equivalent emissions per useful internal floor area per year	kg CO_2 eq./m2/yr	
C.3.1 Construction and demolition waste	Weight of waste and materials generated per 1 m^2 of useful floor area demolished or constructed	kg/m^2/life cycle stage	
C.3.2 Solid waste from building operation	Ratio between the number of collectable solid waste types in a 50 meters distance from the building's entrance and the reference solid waste categories.	%	
D.1.4 VOC concentration in indoor air	VOC concentration in indoor air	µg per cube meter	
D.2.2 Thermal comfort index	Predicted Mean Vote	-	
G.1.4 Use stage energy cost	Energy annual cost per usable floor a	€/m2/yr	

G.1.5 Use stage water cost	Water annual cost per usable floor area	€/m2/yr	

SCENARIO B			
KPI	**Indicator**	**Unit of measure**	**Value**
B.1.1 Primary energy demand (in use stage)	Annual primary energy demand per useful internal floor area	kWh/m2/yr	
B.1.2 Delivered thermal energy demand (in use stage)	Annual delivered thermal energy demand per useful internal floor area	kWh/m2/yr	
B.1.3 Delivered electric energy demand (in use stage)	Annual delivered electric demand per useful internal floor area	kWh/m2/yr	
B.1.4 Energy from renewable sources in total primary energy consumption	Primary energy demand of the building that is met by renewable sources on total primary energy demand	%	Calculation
B.1.5 Energy from renewable sources in total final thermal energy consumption	Share of renewable energy in final thermal energy consumptions	%	
B.1.6 Energy from renewable sources in total final electric energy consumption	Share of renewable energy in final electric energy consumptions	%	
B.1.11 Embodied non-renewable primary energy	Embodied primary non-renewable energy per area	MJ/m2	
B.3.5 Recycled materials	Weight of recycled materials on total weight of materials.	%	
B.4.2 Water consumption for indoor uses (in use stage)	Water consumption per occupant per year	m^3 of water per occupant per year	
C.1.3 Greenhouse Gas Emissions (in use stage)	CO_2 equivalent emissions per useful internal floor area per year	kg CO_2 eq./m2/yr	
C.3.1 Construction and demolition waste	Weight of waste and materials generated per 1 m^2 of useful floor area demolished or constructed	kg/m^2/life cycle stage	
C.3.2 Solid waste from building operation	Ratio between the number of collectable solid waste types in a 50 meters distance from the building's entrance and the reference solid waste categories.	%	

D.1.4 VOC concentration in indoor air	VOC concentration in indoor air	µg per cube meter	
D.2.2 Thermal comfort index	Predicted Mean Vote	-	
G.1.4 Use stage energy cost	Energy annual cost per usable floor a	€/m2/yr	
G.1.5 Use stage water cost	Water annual cost per usable floor area	€/m2/yr	

iii. Financing mechanisms evaluation

Scenario A	*Not relevant*
Scenario B	*Not relevant*
Scenario ….	*Not relevant*

iv. Synergies at urban level

Scenario A	*Not relevant*
Scenario B	*Not relevant*
Scenario ….	*Not relevant*

6. RETROFIT CONCEPT

Not relevant

SELECTED SCENARIO	DESCRIPTION
A. (i.e. Heat pump and solar panels)	Description

KEY ELEMENTS OF THE CONCEPT

Retrofits Strategies	Aspect 1
	Aspect 2
	Aspect 3
Performance improvement	Environment
	Society
	Economy
Financial mechanism	Aspect 1
	Aspect 2
	Aspect 3

KPIs EVALUATION

Please complete a table for each KPIs you calculated. Put a "X" on the selected score.
For each calculated KPIs please calculate the affordability and operativity score summing the score reached for each item (Level of data availability, data quality, ecc…). If you want to propose modifications (i.e. calculation procedure, unit of measure, etc.) please fill the "Proposed modification" box deleting the title "Reasons to eliminate the KPI". If you don't want to keep a KPIs, you should motivate your choice in the "Reasons to eliminate the KPI" box deleting the title "Proposed modifications".

1. URBAN SCALE KPIs

	KPI	Indicator			Unit of measure
	A.1.7 Conservation of Land	**The total area of undeveloped land considered to be of value for ecological or agricultural purposes by relevant authorities, as a percent of the total local area**			**%**
x	**Level of data availability**	0	1	2	3 **X**
		Not available	Scarce	Sufficient	Easy
	Data quality	0	1	2	3 **X**
		Poor	Sufficient	Good	Very Good
	Professional skill	0	1	2	3 **X**
		Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
	Time for evaluation	0	1	2 **X**	3
		More than one week	Less than one week	Less than one day	Less than 4 hours
	Estimated cost	0	1 **X**	2	3
		Low	Acceptable	High	Very Expensive
	Reliability of results	0	1	2 **X**	3
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				14
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI		Indicator			Unit of measure
	B.3.3 Running costs energy for public buildings	**Running cost of energy aggregated**			**Euro/m2/year**
	Level of data availability	0	1	2 **X**	3
		Not available	Scarce	Sufficient	Easy
	Data quality	0	1 **X**	2	3
		Poor	Sufficient	Good	Very Good
	Professional skill	0	1 **X**	2	3
		Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
	Time for evaluation	0	1	2 **X**	3
		More than one week	Less than one week	Less than one day	Less than 4 hours
	Estimated cost	0	1 **X**	2	3
		Low	Acceptable	High	Very Expensive
	Reliability of results	0	1 **X**	2	3
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				8
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI		Indicator			Unit of measure
	C.1.1 Total final thermal energy consumption for building operations	**Aggregated annual total final thermal energy consumption / gross floor area of all buildings**			**kWh/m2/year**
	Level of data availability	0	1 **X**	2	3
		Not available	Scarce	Sufficient	Easy
	Data quality	0	1	2 **X**	3
		Poor	Sufficient	Good	Very Good
	Professional skill	0 **X**	1	2	3
		Formal training and significant	Formal training and applied	Formal training	Limited experience

		experience	experience		
	Time for evaluation	0	1 **X**	2	3
		More than one week	Less than one week	Less than one day	Less than 4 hours
	Estimated cost	0	1 **X**	2	3
		Low	Acceptable	High	Very Expensive
	Reliability of results	0	1 **X**	2	3
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				6
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	**Indicator**			**Unit of measure**
C.1.4 Total final electric energy consumption for building operations	**Aggregated annual total final electric energy consumption / Total gross floor area of all buildings**			**kWh/m2/year**
Level of data availability	0	1 **X**	2	3
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
Professional skill	0 **X**	1	2	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1 **X**	2	3
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0	1 **X**	2	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1 **X**	2	3
	Poor	Sufficient	Good	Very Good
AFFORDABILITY AND OPERATIVITY SCORE				6
DO YOU WANT TO KEEP THIS INDICATOR?				Y

	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)

KPI	Indicator			Unit of measure
C.1.7 Total primary energy demand for building operations	**Buildings total primary energy consumption / gross floor area of all buildings**			**kWh/m2/year**
Level of data availability	0	1 **X**	2	3
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
Professional skill	0 **X**	1	2	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1 **X**	2	3
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0	1 **X**	2	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1 **X**	2	3
	Poor	Sufficient	Good	Very Good
AFFORDABILITY AND OPERATIVITY SCORE				6
DO YOU WANT TO KEEP THIS INDICATOR?				Y
PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	Indicator			Unit of measure
C.2.1 Share of thermal energy generation from on-site renewable sources on final thermal energy	**Share of renewable thermal energy in final thermal energy consumptions**			**%**
Level of data availability	0	1	2 **X**	3
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
Professional skill	0 **X**	1	2	3

		Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
	Time for evaluation	0	1 **X**	2	3
		More than one week	Less than one week	Less than one day	Less than 4 hours
	Estimated cost	0	1 **X**	2	3
		Low	Acceptable	High	Very Expensive
	Reliability of results	0	1 **X**	2	3
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				7
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	**Indicator**			**Unit of measure**
C.2.4 Share of renewable energy on-site, on total primary energy consumptions for buildings operation	**Share of renewable energy in primary energy consumptions**			**%**
Level of data availability	0	1	2 **X**	3
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
Professional skill	0 **X**	1	2	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1 **X**	2	3
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0	1 **X**	2	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1 **X**	2	3
	Poor	Sufficient	Good	Very Good
AFFORDABILITY AND OPERATIVITY SCORE				7

	DO YOU WANT TO KEEP THIS INDICATOR?	Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)	

KPI	**Indicator**			**Unit of measure**
C.2.7 Share of electric energy generation from on-site renewable sources on final electric energy	**Share of renewable electric energy in final electric energy consumptions**			**%**
Level of data availability	0	1	2 **X**	3
	Not available	Scarce	Sufficient	Easy
Data quality	0	1 **X**	2	3
	Poor	Sufficient	Good	Very Good
Professional skill	0 **X**	1	2	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1	2 **X**	3
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0	1 **X**	2	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1 **X**	2	3
	Poor	Sufficient	Good	Very Good
AFFORDABILITY AND OPERATIVITY SCORE				7
DO YOU WANT TO KEEP THIS INDICATOR?				Y
PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	**Indicator**			**Unit of measure**
D.1.2 Total GHG Emissions from energy used in building operations	**CO2 equivalent emissions per useful internal floor area per year**			**kg CO2 eq./m2/yr**
Level of data availability	0	1	2 **X**	3
	Not available	Scarce	Sufficient	Easy

	Data quality	0	1	2 **X**	3
		Poor	Sufficient	Good	Very Good
	Professional skill	0	1 **X**	2	3
		Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
	Time for evaluation	0	1 **X**	2	3
		More than one week	Less than one week	Less than one day	Less than 4 hours
	Estimated cost	0	1 **X**	2	3
		Low	Acceptable	High	Very Expensive
	Reliability of results	0	1 **X**	2	3
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				8
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	**Indicator**			**Unit of measure**
E.1.6 Consumption of potable water for residential population	**Water consumption per occupant**			**m3 per occupant*yr**
Level of data availability	0	1 **X**	2	3
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
Professional skill	0	1	2 **X**	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1	2 **X**	3
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0 **X**	1	2	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1 **X**	2	3
	Poor	Sufficient	Good	Very Good
AFFORDABILITY AND OPERATIVITY SCORE				8

	DO YOU WANT TO KEEP THIS INDICATOR?	Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)	

KPI	**Indicator**			**Unit of measure**
E.1.7 Consumption of potable water for non-residential building systems	**Water consumption per occupant**			**m3 per occupant*yr**
Level of data availability	0	1 **X**	2	3
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
Professional skill	0	1	2 **X**	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1	2 **X**	3
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0 **X**	1	2	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1 **X**	2	3
	Poor	Sufficient	Good	Very Good
AFFORDABILITY AND OPERATIVITY SCORE				8
DO YOU WANT TO KEEP THIS INDICATOR?				Y
PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	**Indicator**	**Unit of measure**
E.2.3 Solid waste from construction and demolition projects retained in the area for re-use or recycling	**Percent of solid waste from construction and demolition projects retained annually in the area for re-use or recycling.**	**%**

	Level of data availability	0	1 **X**	2	3
		Not available	Scarce	Sufficient	Easy
	Data quality	0 **X**	1	2	3
		Poor	Sufficient	Good	Very Good
	Professional skill	0	1	2 **X**	3
		Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
	Time for evaluation	0	1	2 **X**	3
		More than one week	Less than one week	Less than one day	Less than 4 hours
	Estimated cost	0 **X**	1	2	3
		Low	Acceptable	High	Very Expensive
	Reliability of results	0	1 **X**	2	3
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				6
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	**Indicator**			**Unit of measure**
E.3.2 Consumption of non-renewable material resources for construction of infrastructure	**Aggregate consumption of non-renewable material resources for construction or renovation of infrastructure**			**Tonnes/ 1000 m2**
Level of data availability	0	1 **X**	2	3
	Not available	Scarce	Sufficient	Easy
Data quality	0 **X**	1	2	3
	Poor	Sufficient	Good	Very Good
Professional skill	0	1	2	3 **X**
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1	2 **X**	3
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0	1 **X**	2	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1 **X**	2	3
	Poor	Sufficient	Good	Very Good

	AFFORDABILITY AND OPERATIVITY SCORE	8
	DO YOU WANT TO KEEP THIS INDICATOR?	Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)	

KPI	**Indicator**			**Unit of measure**
F.1.3 Recharge of groundwater through permeable paving or landscaping	**Permeable area**			**%**
Level of data availability	0	1	2	3 **X**
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2	3 **X**
	Poor	Sufficient	Good	Very Good
Professional skill	0	1	2 **X**	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1 **X**	2	3
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0	1 **X**	2	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
AFFORDABILITY AND OPERATIVITY SCORE				12
DO YOU WANT TO KEEP THIS INDICATOR?				Y
PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	**Indicator**	**Unit of**

					measure
	F.2.3 Ambient air quality with respect to particulates <10 mu (PM10) over a one year period	**Number of days exceeding the daily limits in a year**			**n**
	Level of data availability	0	1 **X**	2	3
		Not available	Scarce	Sufficient	Easy
	Data quality	0	1	2 **X**	3
		Poor	Sufficient	Good	Very Good
	Professional skill	0 **X**	1	2	3
		Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
	Time for evaluation	0 **X**	1	2	3
		More than one week	Less than one week	Less than one day	Less than 4 hours
	Estimated cost	0	1	2 **X**	3
		Low	Acceptable	High	Very Expensive
	Reliability of results	0	1	2 **X**	3
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				7
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

	KPI	**Indicator**			**Unit of measure**
	G.2.1 Performance of the public transport	**Percentage of inhabitants that are within 400 meters walking distance of at least one public transportation service stop**			**%**
	Level of data availability	0	1	2	3 **X**
		Not available	Scarce	Sufficient	Easy
	Data quality	0	1	2	3 **X**
		Poor	Sufficient	Good	Very Good
	Professional skill	0	1	2	3 **X**
		Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
	Time for evaluation	0	1	2	3 **X**
		More than one week	Less than one week	Less than one day	Less than 4 hours
	Estimated cost	0 **X**	1	2	3
		Low	Acceptable	High	Very

					Expensive
	Reliability of results	0	1	2	3 **X**
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				15
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI		**Indicator**			**Unit of measure**
	G.2.4 Quality of pedestrian and bicycle network	**Total walkway meters of dedicated pedestrian paths and meters of bicycle path per 100 inhabitants**			**m/100 inhabitants**
	Level of data availability	0	1	2	3 **X**
		Not available	Scarce	Sufficient	Easy
	Data quality	0	1	2	3 **X**
		Poor	Sufficient	Good	Very Good
	Professional skill	0	1	2	3 **X**
		Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
	Time for evaluation	0	1	2	3 **X**
		More than one week	Less than one week	Less than one day	Less than 4 hours
	Estimated cost	0 **X**	1	2	3
		Low	Acceptable	High	Very Expensive
	Reliability of results	0	1 **X**	2	3
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				13
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	Indicator			Unit of measure
G.4.2 Availability and proximity of key services	**Percentage of inhabitants that are within 800 meters walking distance of at least 3 key services**			**%**
Level of data availability	0	1	2	3 **X**
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
Professional skill	0	1	2	3 **X**
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1	2	3 **X**
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0 **X**	1	2	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
AFFORDABILITY AND OPERATIVITY SCORE				13
DO YOU WANT TO KEEP THIS INDICATOR?				Y
PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	Indicator			Unit of measure
G.6.3 Community involvement in urban planning activities	**Level of involvement of users in urban planning**			**Level**
Level of data availability	0	1	2 **X**	3
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
Professional skill	0	1	2 **X**	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1	2	3 **X**
	More than one week	Less than one week	Less than one day	Less than 4 hours

	Estimated cost	0	1 **X**	2	3
		Low	Acceptable	High	Very Expensive
	Reliability of results	0	1 **X**	2	3
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				11
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

2. BUILDING SCALE KPIs

KPI	Indicator			Unit of measure
B.1.1 Primary energy demand (in use stage)	**Annual primary energy demand per useful internal floor area**			**kWh/m2/yr**
Level of data availability	0	1	2	3 **X**
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
Professional skill	0 **X**	1	2	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1 **X**	2	3
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0	1 **X**	2	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
AFFORDABILITY AND OPERATIVITY SCORE				9
DO YOU WANT TO KEEP THIS INDICATOR?				Y
PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	Indicator			Unit of measure
B.1.2 Delivered thermal energy demand (in use stage)	**Annual delivered thermal energy demand per useful internal floor area**			**kWh/m2/yr**
Level of data availability	0	1	2	3 **X**
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
Professional skill	0 **X**	1	2	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1 **X**	2	3
	More than one week	Less than one week	Less than one day	Less than 4 hours

	Estimated cost	0	1 **X**	2	3
		Low	Acceptable	High	Very Expensive
	Reliability of results	0	1	2 **X**	3
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				9
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	**Indicator**			**Unit of measure**
B.1.3 Delivered electric energy demand (in use stage)	**Annual delivered electric demand per useful internal floor area**			**kWh/m2/yr**
Level of data availability	0	1	2	3 **X**
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
Professional skill	0 **X**	1	2	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1 **X**	2	3
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0	1 **X**	2	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
AFFORDABILITY AND OPERATIVITY SCORE				9
DO YOU WANT TO KEEP THIS INDICATOR?				Y
PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI		Indicator			Unit of measure
	B.1.4 Energy from renewable sources in total primary energy consumption	**Primary energy demand of the building that is met by renewable sources on total primary energy demand**			**%**
	Level of data availability	0	1	2	3 **X**
		Not available	Scarce	Sufficient	Easy
	Data quality	0	1	2 **X**	3
		Poor	Sufficient	Good	Very Good
	Professional skill	0 **X**	1	2	3
		Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
	Time for evaluation	0	1 **X**	2	3
		More than one week	Less than one week	Less than one day	Less than 4 hours
	Estimated cost	0	1 **X**	2	3
		Low	Acceptable	High	Very Expensive
	Reliability of results	0	1	2 **X**	3
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				9
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI		Indicator			Unit of measure
	B.1.5 Energy from renewable sources in total thermal energy consumption	**Share of renewable energy in final thermal energy consumptions**			**%**
	Level of data availability	0	1	2	3 **X**
		Not available	Scarce	Sufficient	Easy
	Data quality	0	1	2 **X**	3
		Poor	Sufficient	Good	Very Good
	Professional skill	0 **X**	1	2	3
		Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
	Time for evaluation	0	1 **X**	2	3
		More than one week	Less than one week	Less than one day	Less than 4 hours
	Estimated cost	0	1 **X**	2	3
		Low	Acceptable	High	Very

					Expensive
	Reliability of results	0	1	2 **X**	3
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				9
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	**Indicator**			**Unit of measure**
B.1.6 Energy from renewable sources in total electric energy consumption	**Share of renewable energy in final electric energy consumption**			**%**
Level of data availability	0	1	2	3 **X**
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
Professional skill	0 **X**	1	2	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1 **X**	2	3
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0	1 **X**	2	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
AFFORDABILITY AND OPERATIVITY SCORE				9
DO YOU WANT TO KEEP THIS INDICATOR?				Y
PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	**Indicator**	**Unit of**

					measure
	B.1.11 Embodied non-renewable primary energy	**Embodied primary non-renewable energy (MJ) per gross area of the building**			**MJ/m²**
	Level of data availability	0	1 **X**	2	3
		Not available	Scarce	Sufficient	Easy
	Data quality	0	1	2 **X**	3
		Poor	Sufficient	Good	Very Good
	Professional skill	0 **X**	1	2	3
		Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
	Time for evaluation	0	1 **X**	2	3
		More than one week	Less than one week	Less than one day	Less than 4 hours
	Estimated cost	0	1 **X**	2	3
		Low	Acceptable	High	Very Expensive
	Reliability of results	0	1	2 **X**	3
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				7
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

	KPI	**Indicator**			**Unit of measure**
	B.3.5 Recycled materials	**Weight of recycled materials on total weight of materials**			**%**
	Level of data availability	0	1 **X**	2	3
		Not available	Scarce	Sufficient	Easy
	Data quality	0	1	2 **X**	3
		Poor	Sufficient	Good	Very Good
	Professional skill	0 **X**	1	2	3
		Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
	Time for evaluation	0	1 **X**	2	3
		More than one week	Less than one week	Less than one day	Less than 4 hours
	Estimated cost	0	1 **X**	2	3
		Low	Acceptable	High	Very Expensive
	Reliability of results	0	1 **X**	2	3
		Poor	Sufficient	Good	Very Good

	AFFORDABILITY AND OPERATIVITY SCORE	6
	DO YOU WANT TO KEEP THIS INDICATOR?	Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)	

KPI	**Indicator**			**Unit of measure**
B.4.2 Water consumption for indoor uses (in use stage)	**Water consumption per occupant per year**			**m3 of water r occupant per year**
Level of data availability	0	1	2 **X**	3
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
Professional skill	0	1	2 **X**	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1	2	3 **X**
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0	1 **X**	2	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1 **X**	2	3
	Poor	Sufficient	Good	Very Good
AFFORDABILITY AND OPERATIVITY SCORE				11
DO YOU WANT TO KEEP THIS INDICATOR?				Y
PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	Indicator			Unit of measure
C.1.3 Greenhouse Gas Emissions (in use stage)	**CO2 equivalent emissions per useful internal floor area per year**			**kg CO2 eq./m2/yr**
Level of data availability	0	1	2 **X**	3
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
Professional skill	0 **X**	1	2	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1 **X**	2	3
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0	1 **X**	2	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
AFFORDABILITY AND OPERATIVITY SCORE				8
DO YOU WANT TO KEEP THIS INDICATOR?				Y
PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	Indicator			Unit of measure
C.3.1 Construction and demolition waste	**Weight of waste and materials generated per 1 m2 of useful floor area demolished or constructed**			**kg/m2/life cycle stage**
Level of data availability	0	1 **X**	2	3
	Not available	Scarce	Sufficient	Easy
Data quality	0	1 **X**	2	3
	Poor	Sufficient	Good	Very Good
Professional skill	0	1 **X**	2	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1 **X**	2	3
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0	1 **X**	2	3
	Low	Acceptable	High	Very Expensive

	Reliability of results	0	1 **X**	2	3
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				6
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

	KPI	**Indicator**			**Unit of measure**
	C.3.2 Solid waste from building operation	**Ratio of the number of collectable solid waste types within a 100 m distance from the building's entrance to the reference solid waste categories**			**%**
	Level of data availability	0	1	2	3 **X**
		Not available	Scarce	Sufficient	Easy
	Data quality	0	1	2	3 **X**
		Poor	Sufficient	Good	Very Good
	Professional skill	0	1	2	3 **X**
		Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
	Time for evaluation	0	1	2	3 **X**
		More than one week	Less than one week	Less than one day	Less than 4 hours
	Estimated cost	0 **X**	1	2	3
		Low	Acceptable	High	Very Expensive
	Reliability of results	0	1	2	3 **X**
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				12
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	Indicator			Unit of measure
D.1.4 VOC concentration in indoor air	**VOC concentration in indoor air**			**µg/m3**
Level of data availability	0	1 **X**	2	3
	Not available	Scarce	Sufficient	Easy
Data quality	0	1 **X**	2	3
	Poor	Sufficient	Good	Very Good
Professional skill	0 **X**	1	2	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0 **X**	1	2	3
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0	1	2 **X**	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1 **X**	2	3
	Poor	Sufficient	Good	Very Good
AFFORDABILITY AND OPERATIVITY SCORE				5
DO YOU WANT TO KEEP THIS INDICATOR?				Y
PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	Indicator			Unit of measure
D.2.2 Thermal comfort index	**PMV**			**-**
Level of data availability	0	1 **X**	2	3
	Not available	Scarce	Sufficient	Easy
Data quality	0	1 **X**	2	3
	Poor	Sufficient	Good	Very Good
Professional skill	0 **X**	1	2	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience

	Time for evaluation	0	1 **X**	2	3
		More than one week	Less than one week	Less than one day	Less than 4 hours
	Estimated cost	0	1 **X**	2	3
		Low	Acceptable	High	Very Expensive
	Reliability of results	0	1 **X**	2	3
		Poor	Sufficient	Good	Very Good
	AFFORDABILITY AND OPERATIVITY SCORE				5
	DO YOU WANT TO KEEP THIS INDICATOR?				Y
	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				

KPI	**Indicator**			**Unit of measure**
G.1.4 Use stage energy cost	**Energy annual cost per usable floor area**			**€/m2/yr**
Level of data availability	0	1 **X**	2	3
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
Professional skill	0	1 **X**	2	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1	2 **X**	3
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0	1 **X**	2	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1 **X**	2	3
	Poor	Sufficient	Good	Very Good
AFFORDABILITY AND OPERATIVITY SCORE				8
DO YOU WANT TO KEEP THIS INDICATOR?				Y

	PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)

KPI	Indicator			Unit of measure
G.1.5 Use stage water cost	**Water annual cost per usable floor are**			**€/m2/yr**
Level of data availability	0	1 **X**	2	3
	Not available	Scarce	Sufficient	Easy
Data quality	0	1	2 **X**	3
	Poor	Sufficient	Good	Very Good
Professional skill	0	1 **X**	2	3
	Formal training and significant experience	Formal training and applied experience	Formal training	Limited experience
Time for evaluation	0	1	2 **X**	3
	More than one week	Less than one week	Less than one day	Less than 4 hours
Estimated cost	0	1 **X**	2	3
	Low	Acceptable	High	Very Expensive
Reliability of results	0	1 **X**	2	3
	Poor	Sufficient	Good	Very Good
AFFORDABILITY AND OPERATIVITY SCORE				8
DO YOU WANT TO KEEP THIS INDICATOR?				Y
PROPOSED MODIFICATIONS or REASON TO ELIMINATE THE KPI (calculation method, indicator, unit of measure, etc...)				