CESBA Alps

CESBA ALPINE SPACE - SUSTAINABLE TERRITORIES

ASP 151 - Priority 2 Low Carbon Alpine Space

CESBA SUSTAINABLE TERRITORIES TOOL GENERIC FRAMEWORK

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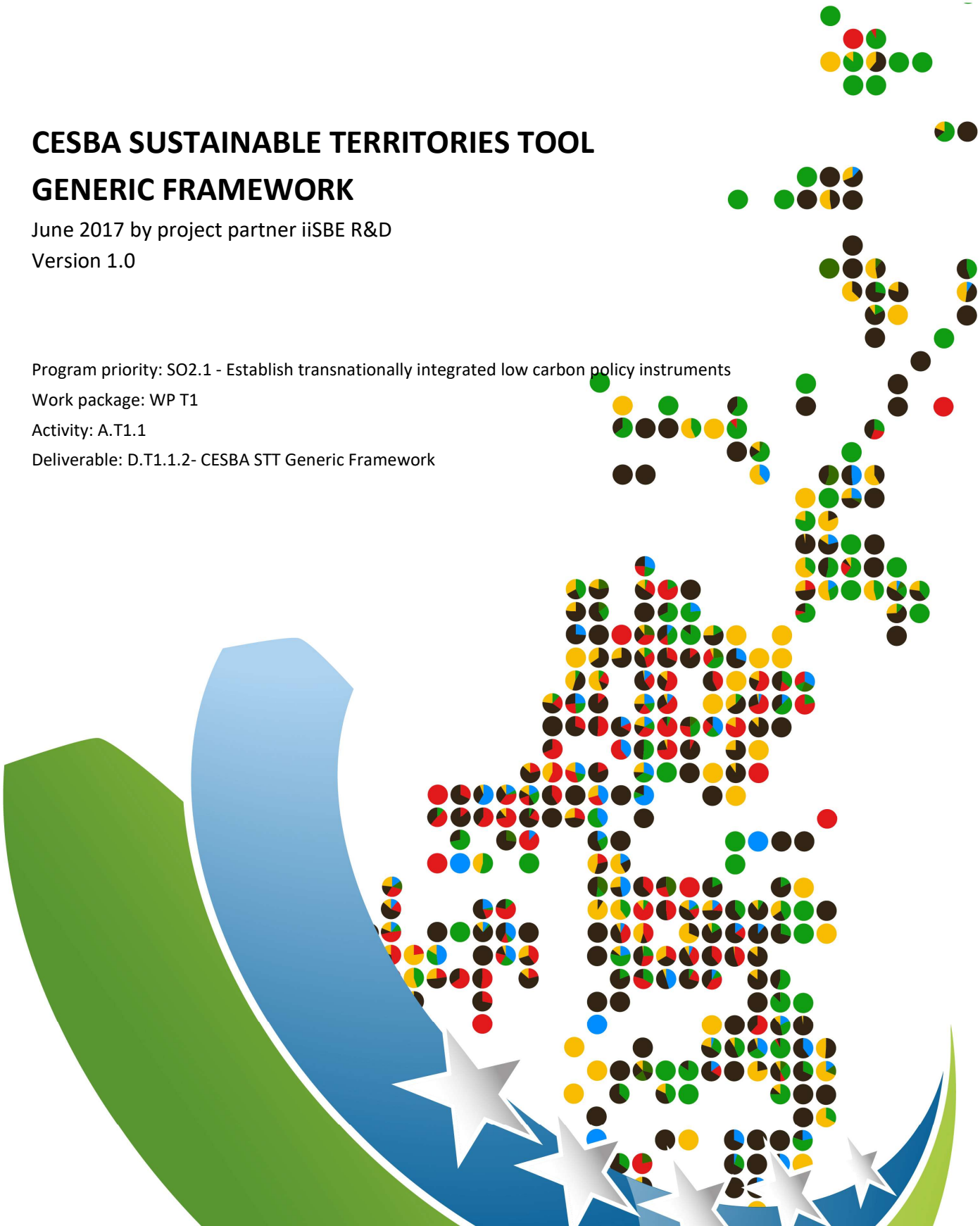

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Content

1 Introduction

Andrea Moro, Work Package T1 Responsible, iiSBE Italia R&D

CESBA Sustainable Territories Generic Framework is a tool useful to measure the level of sustainability of a territory.
It is a generic multicriteria assessment tool that may be used by third parties to develop rating systems at territorial scale fully contextualized to local conditions.
Originally, the idea of the "Generic Framework" was launched in 1996 by the "Green Building Challenge" international research process. The objective was to develop a transnational common building assessment tool able to generate, through a contextualization process, harmonized national and regional rating system.
The advantage of a generic framework consists in the possibility to transnationally share the same assessment methodology and in the same time to preserve the possibility to adapt the system to local conditions reflecting regional priorities and practices. The generic framework acts as a common transnational language. Having the same meaning, the assessment results are comparable. The use of assessment systems in international policies and initiatives is thus facilitated. In 2000 the Green Building Challenge process was renamed Sustainable Building Challenge and since that time it is coordinated by the no profit organization iiSBE (international initiative for a Sustainable Built Environment).
Through the collaboration of more than 25 countries, representing all the 5 continents, the main result of the SBC has been the SBTool, a generic framework and relative assessment methodology that generated several national and regional assessment systems as Protocollo ITACA (Italy), Verde (Spain), Total Quality (Austria), SBTool CZ (Cech Republic), SBTool PT (Portugal) and inspired the upgrade of several international standard.

The generic framework approach is perfectly in line with the 9 CESBA principles. It is an open source system co-created through a 25 years long process. It is Holistic, taking in account all the sustainability issues. It is fully contextualizable to regional conditions allowing to assign local weighs and benchmarks to criteria. It allows the comparability of results at transnational level facilitating the use of a common methodological "language". It is simple to use and developed for mass certification. For this reason, the SBTool has been chosen by CESBA Alps project as reference methodology.

The most innovative and challenging objective of CESBA Alps has been to define the first generic framework at territorial level (CESBA STT Generic Framework). It means a transnational common and generic multicriteria assessment system that Project Partners will use to develop regional harmonized and compatible assessment tools able to rate the level of sustainability of a territory.

The CESBA STT generic framework is the results of the fruitful and strong cooperation of the CESBA Alps project partners.
It is at disposal of any regional or territorial administration in the Alpine Space that intends to develop its own sustainability assessment tool. The use of harmonized regional tools will contribute to the common sustainability targets of Alpine regions and will contribute to the implementation of EUSALP targets.

Turin, June 2017.

2 Generic Framework structure and logic

The CESBA Sustainable Territories Generic Framework (CESBA STT GF) is a transnational generic multicriteria assessment system for rating the sustainability performance of any alpine space territory with a size between 50 Km^2 and 500 Km^2.

"Generic" means that the CESBA STT GF needs to be configured to carry out an assessment on a specific territory.
The configuration process consists in the contextualization of the CESBA STT GF to local conditions in the way to reflect the regional sustainability priorities and practices. The contextualization takes place through the selection of the active assessment criteria and the assignment of a weight and a performance scale to them.

Local sustainability priorities are set up assigning a regional weight to the assessment criteria. This aspect is in line with a key CESBA principle: it isn't possible to set transnational weights valid for all regions because the climatic conditions, the sustainability priorities, the social-economic contexts are different.

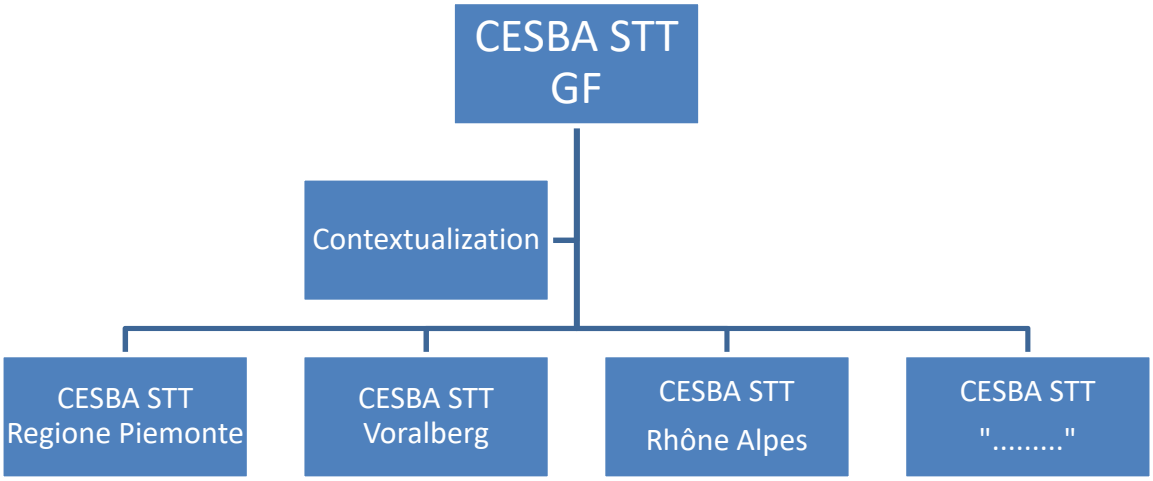
The CESBA STT GF also allows to reflect the local practice, regulations, standards and level of advancement in the sustainability field through the possibility to define for each assessment criterion a local performance scale. Following the CESBA principles, it is not proper to assign a transnational minimum reference performance because the conditions in the alpine regions are different.

Despite the different weights and benchmarks of local systems that are derived from the CESBA STT GF, the results produced by them are fully compatible because based on the same transnational methodology. The results produced have the same meaning: the score represents how much a territory is performing with regards to the minimum local acceptable performance. The transitional comparability of assessment results is guaranteed by the CESBA Alps Passport and the CESBA KPIs.

The use of regional systems based on different methodologies would bring to the same confused situation that today still characterizes the assessment systems at building scale. Only in the European Union there are more than 60 systems in use, all producing scores not comparable. A situation that is still confusing the stakeholders of the building sector.

Through the configuration of the CESBA STT GF, the contextualization process, it is possible to produce local assessment tools for rating the sustainability of any territory in the alpine space. Conventionally, the local systems derived from the CESBA STT GF are named "CESBA STT + Region or territory name" (i.e CESBA STT Regione Piemonte, CESBA STT Val Seriana, etc.). The CESBA STT GF is not operational and can't be used as it is. It needs always to be adapted to local conditions.

The advantage of the Generic Framework principle is that it makes possible to transnationally share the same assessment methodology and approach preserving the possibility to adapt the tool to local conditions. The generic framework is a common transnational language. This aspect is an added value because it facilitates the use of assessment tools in transnational policies and the share of best practices.



Generation of local tools from the Generic Framework

2.1 Structure of the CESBA STT GF

The CESBA STT Generic Framework is organized in three modules:

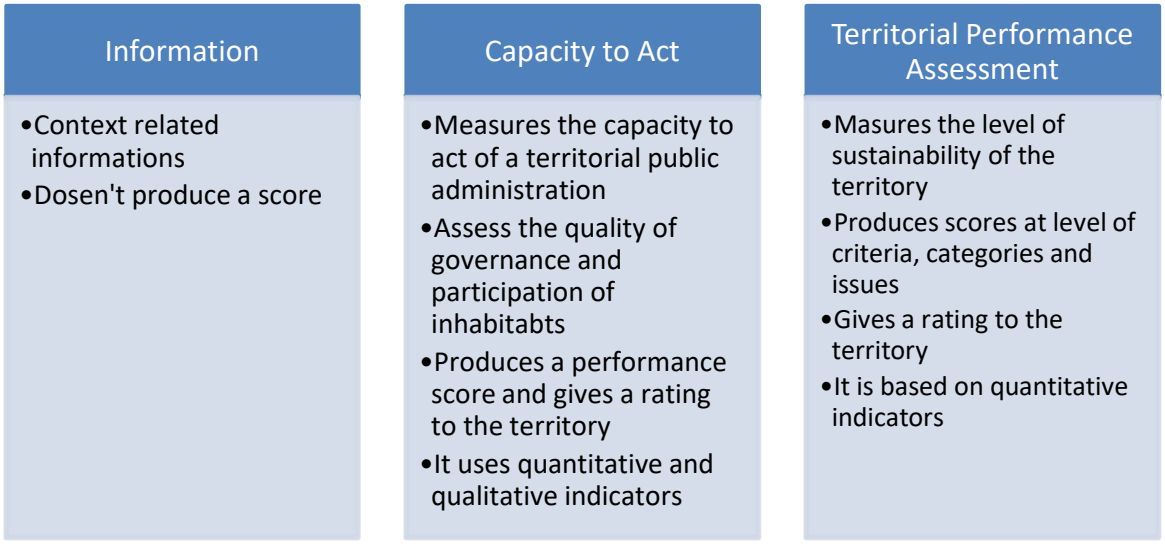
- Information
- Capacity to Act
- Territorial Performance Assessment

The "Information" module provides context related information useful to understand the key characteristics of the territory under assessment. The module is composed by a set of indicators that describe the territory from the point of view of climate, land characteristics, natural risks, demography and renewable energy potential. All these aspects are in general not modifiable and represent an identity card of the territory. The "Information" module doesn't produce a rating score. The list of indicators included in this module is described in Chapter 4.

The "Capacity to Act" module allows to measure and to score the effectiveness and quality of local policies in terms of participation and governance. It contains 28 criteria. Each of them is associated to an indicator, quantitative or qualitative, that allows to measure the performance reached by the territory. The assessment methodology of the multicriteria tool is described in Chapter 3. Complementary to the indicators of the "Capacity to Act" module is the SHARK methodology that is based on an interview based approach and it is targeted to communities. SHARK is described in Chapter 7

The "Territorial Performance Assessment" (TPA) module allows to measure the performance reached by a territory with regards to 5 main issues and to give a rating to it. The 5 issues are: Territories and Environment, Energy and Resources, Infrastructures and Services, Society, Economy. The module contains more than 250 assessment criteria and relative indicators organized in 31 categories. All criteria measure an objective performance on the base of a specific assessment

method. The TPA module basically measures “physical” quantities. This module hasn’t a prescriptive nature but instead it allows to measure the actual sustainability of a territory and its potential future performance on the base of possible scenarios. For this reason, the TPA module is very useful to support decision making processes at territorial level. Its application can make a public authority aware about the actual level of sustainability of the territory and it can support a decision-making process targeted to identify the best strategies to improve its quality. The assessment methodology is the same one of the “Capacity to Act” module and it is described in Chapter 3. The list of criteria of the Territorial Performance Assessment module is described in Chapter 6.



Modules of the CESBA STT GF

From the CESBA STT Generic Framework it is possible to derive harmonized local assessment tools through a contextualization process articulated in 3 steps:

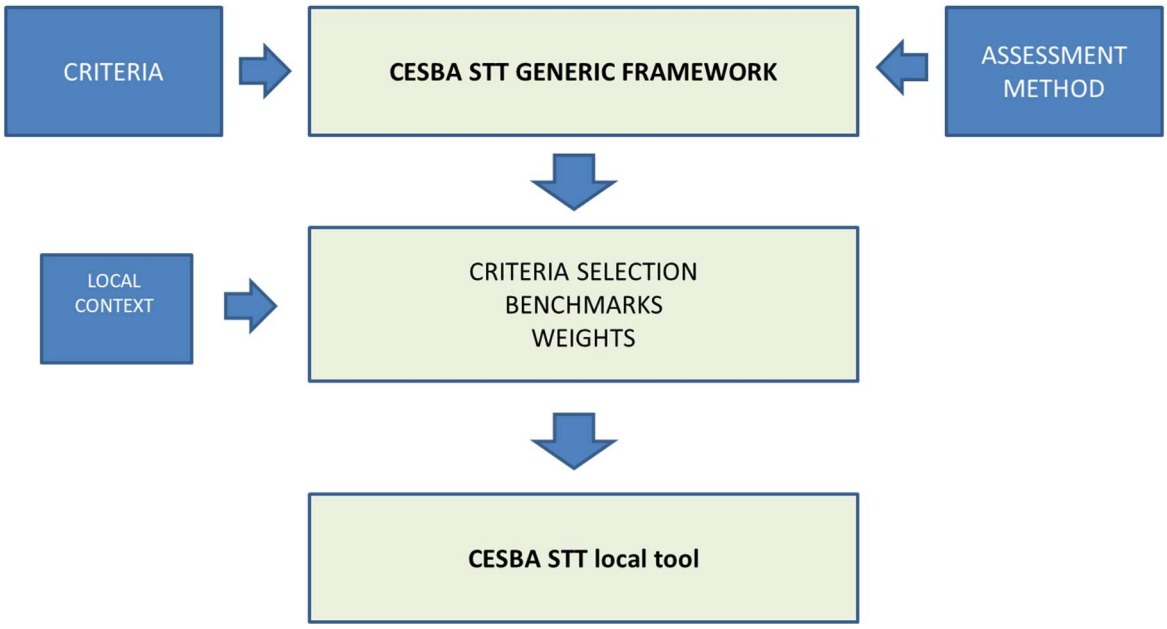
- Selection of the active criteria
- Benchmarking
- Weighting

The first step consists in the selection of the criteria that will be used to carry out the assessment. The criteria are selected from the whole list of the “Capacity to act” and “Territorial Performance Assessment” modules. Each regional authority or third party can freely select the active criteria on the base of its needs and objectives. There isn’t a minimum number of criteria to be selected. The local systems can widely vary from this point of view. Only a core set of criteria, the Key Performance Indicators, are mandatory for all local CESBA STT. The KPIs represent the priority sustainability transnational issues and they allow to compare the key territorial performances in the alpine space through the CESBA Passport. The CESBA KPIs are described in the Deliverable T1.2.1, the Passport in the Deliverable T1.2.2.

The second step, benchmarking, consists in the definition of the scoring scale for each selected criterion. The benchmark is a quantification of the indicator’s value corresponding to the minimum acceptable performance and the one that is considered the best at regional level. Benchmarks can’t be the same at transnational level because the local conditions of each region are different (climate, building practice, standards, level of advancement in the sustainability field, etc..). The scoring scale used in the CESBA STT GF ranges from -1 to 5. Where zero represent the minimum acceptable performance, 5 the excellence, 3 the best practice and -1 a negative performance.

The final step, weighting, consists in the assignment of a weight to each criterion, category and issue. The weight is expressed as a percentage. This process allows to align the assessment tool to local environmental, social and economic priorities. These ones are not the same in all alpine space regions. The contextualisation process take place through the use of a software that corresponds with the Deliverable T1.4.1 and T1.4.2.

Through the CESBA STT Generic Framework all regions in the alpine space can share common assessment methodologies, criteria and indicators. It means to speak the same language. The results of all local assessments will have the same meaning. This aspect will facilitate the transnational cooperation. In the same time, the assignment of local benchmarks and weight allows to reflect the local conditions.



Contextualization process of the CESBA STT Generic Framework

3 CESBA Alps Assessment Methodology

The assessment method adopted in the CESBA STT Generic Framework multicriteria system is the "SBEMethod" (Sustainable Built Environment Method) developed by iiSBE (international initiative for a Sustainable Built Environment). In general, the SBEMethod is a generic multi-criteria analysis methodology for assessing the sustainability of the built environment. Starting from a set of criteria the SBEMethod provides a final score about a building, urban area or territory overall performance.

This assessment methodology is used in the modules "Capacity to Act" and "Territorial Performance Assessment" of the CESBA STT GF. Using this methodology it is possible to give a sustainability rating to a territory.

The sustainability score of the territory under assessment is computed through a mathematical procedure (called assessment procedure) which is articulated in 3 main steps:

- characterization: territory's performances are quantified through indicators in regard of each criterion;
- normalization: indicator values are adimensionalized and rescaled in a suitable interval, called normalization interval. The normalization consists in the assignment of a score to the indicator's value.;
- aggregation: normalized scores are combined through weighted sums to produce the final concise score.

The main elements of the SBEMethod can be summarized as follows:

1. a set of criteria;
2. a set of indicators, which allow to quantify the territory's performances with respect to each criterion;
3. a normalization method (scoring system);
4. an aggregation method;
5. a panel of experts who establish and define criteria and indicators. In CESBA Alps, the CESBA Local Committees act as panel of experts.

3.1 Basic definitions and structure of the SBEMethod

The *SBEMethod* is organized in issues, categories and criteria:

- **Issues:** describe general themes, recognized as relevant for assessing the sustainability of a territory. For instance, the issues of the TPA module are 5: Territories and Environment, Energy and Resources, Infrastructures and Services, Society, Economy. The Capacity to Act module includes only one issue: Participation and Governance

- **Categories:** concern particular aspects of issues. For instance, the issue "Energy and Resources" contains 4 categories: Energy consumptions, Sustainable Energy, Water consumption, Land and building stock use.

- **Criteria:** detail specific aspects of categories. They represent the basic assessment entries used to characterize each territory since the very beginning of the assessment process. For instance, the category "Water consumption" includes 3 criteria: Consumption of water- Human uses, Consumption of water for Agriculture, Winter sports water consumptions.

Issues, categories and criteria are linked in the following sense: each issue includes a variable number of categories (depending from issue to issue), each of them describes a particular aspect of the issue whom it belongs to. The total number of categories in the TPA module is 31, divided in the 5 issues: Territories and Environment (13), Energy and Resources (4), Infrastructures and Services (7), Society (5), Economy (6). Categories include different *criteria*, each of them describing a particular aspect of the corresponding category. The total number of criteria in the TPA module is 259.

The Capacity to Act module includes one issue, one category and 28 criteria.

Some examples of issues, related categories and criteria from the TPA module are reported below:

- Issue: 'Energy/Resources Consumption', category: 'Energy Consumptions', criterion: 'Final Energy Consumptions'.
- Issue: 'Territories and Environment', category: 'Land', criterion: 'Forest Area'.
- Issue: 'Society', category: 'Socio Economic Aspects', criterion: 'Education'.

Each criterion is combined with a (some) physical quantity(ies). These allow to quantify territory's performances with regard to each criterion. In the SBEMethod, such quantities are called 'indicators'. An indicator is a methodology which allows to characterize (not necessarily in numerical terms) the territory's performance with respect to the corresponding criterion.

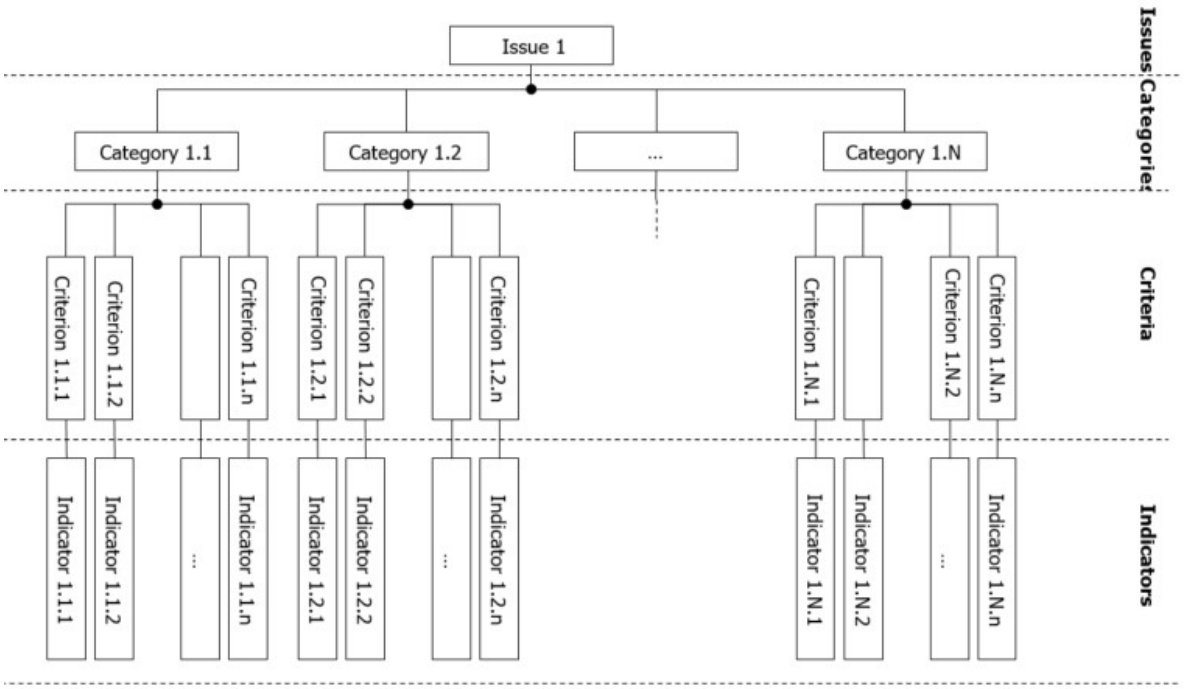
In the SBEMethod, qualitative criteria are also present, for which the territory's performance is provided in terms of a comparison with a certain number of reference scenarios defined within the corresponding indicator.

Some examples of indicators and corresponding criteria from the TPA module are listed below:

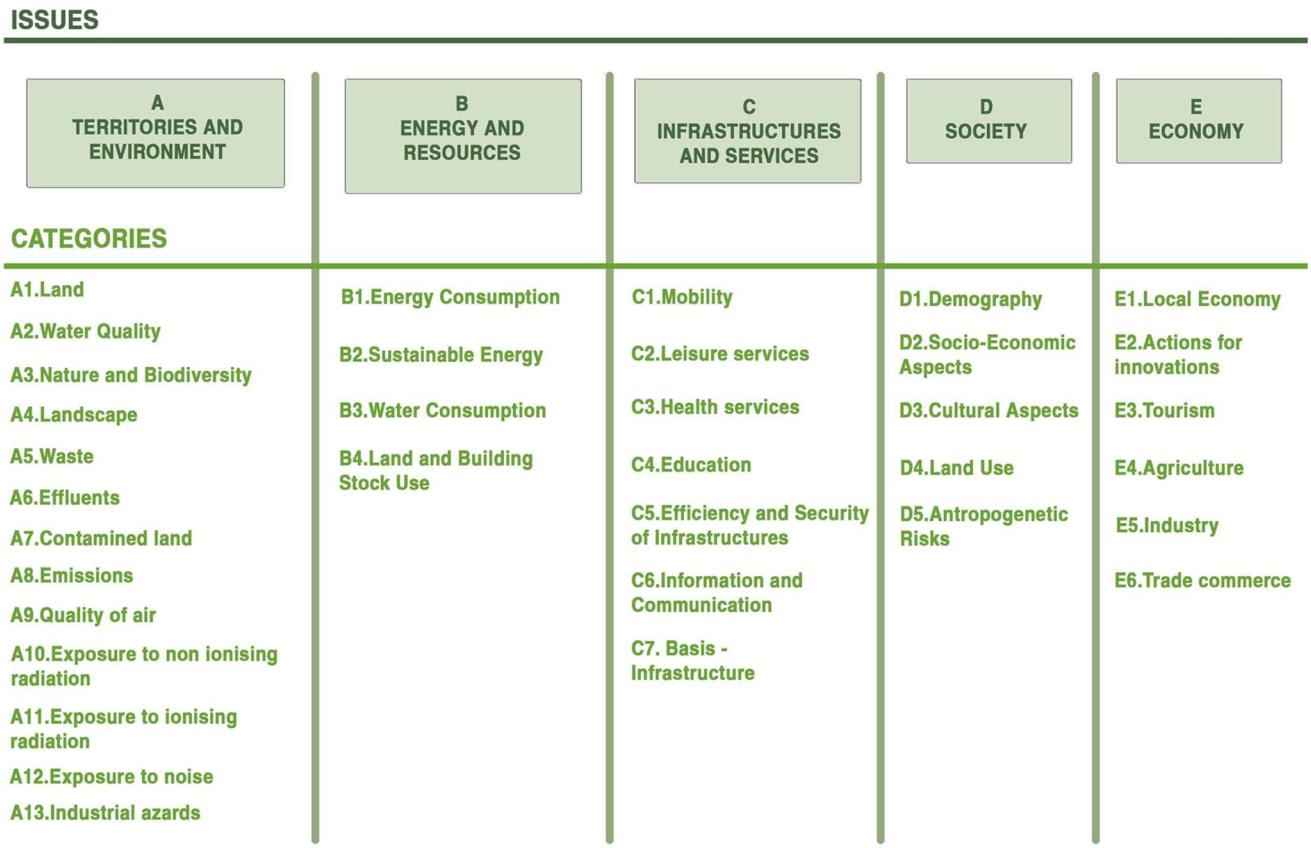
- Criterion: Final energy consumptions – Indicator: Energy consumed per inhabitant – Unit of measure: KTEP/inhabitant
- Criterion: Forest area – Indicator: ratio between forested areas and the geographical area considered – Unit of measure:%
- Criterion: Education – indicator: share of population with at least secondary education – Unit of measure: %

Note that, in principle, several indicators can be associated with the same criterion, as one can define multiple strategies to quantify the territory's performance in regard to a specific criterion.

In the *SBEMethod* each criterion is generally associated with a single indicator.



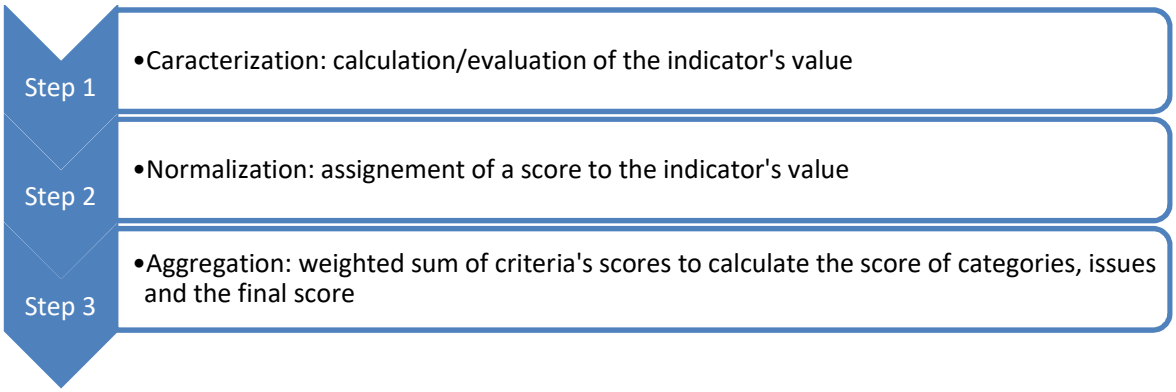
Schematic representation of a generic Issue's structure in the SBEMethod



Structure of the Territorial Performance Assessment module: Issues and Categories

3.2 The assessment procedure in the SBEMethod

The main goal of the SBEMethod is to provide a final concise score, which summarizes the overall performance of the territory with respect to all criteria. Such a score is called 'final score', and is computed starting from indicator values. The mathematical procedure used to compute the final score is called assessment procedure, and is articulated in three main steps:

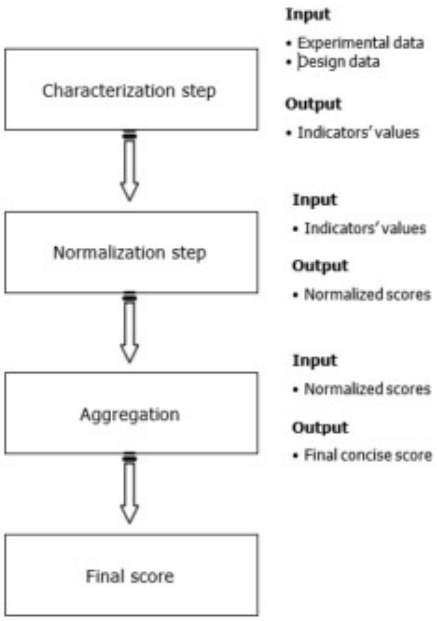


Characterization step. Territory's performances on each criterion are characterized either by means of a numerical value (if the corresponding indicator represents some physical quantity), or by means of a comparison with some reference scenarios defined by the associated indicator (in the case of qualitative criteria). The output of the characterization step is composed by a set of numerical values (the indicators' values), each of them representing the territory's performances in regard to each criterion. The numerical value could for instance correspond to an energy consumption (i.e. kWh/inhabitant).

Normalization step Indicators' values are adimensionalized and rescaled in a suitable interval called *normalization interval*. The output of the normalization step is represented by a set of normalized scores, each of them is associated with a criterion. The normalization interval used in CESBA STT GF is from -1 to +5. The mining of scores is:

Score	Meaning
-1	The score corresponds to a value of the indicator that is under the minimum acceptable performance.
0	The score corresponds to a value of the indicator that represents the minimum acceptable performance. It is usually defined on the base of regulations and standards.
1	The score corresponds to a value of the indicator that represents a minimum increase of performance with regards to the minimum acceptable performance.
2	The score corresponds to a value of the indicator that represents a substantial increase of performance with to the minimum acceptable performance.
3	The score corresponds to a value of the indicator that represents a best practice.
4	The score corresponds to a value of the indicator that represents an improvement towards the best practice level.
5	The score corresponds to a value of the indicator that represents an excellent and ideal performance.

Aggregation step Normalized scores are combined together (or *aggregated)* in order to compute the overall performance score. The aggregation step consists if a series of weighted sum.



Input / Outputs of the SBEMethod assessment process.

To describe the assessment method in mathematical terms, in the following, these symbols will be used to denote:

- A_i, the i-th issue, i = 1,….., N_A, and N_A is the total number of issues included in the SBEMethod. E.g: the third issue will be denoted with the symbol A_3.
- $C_{i,j}$, the j-th category in A_i, j = 1,……,$N_C^{(i)}$, where $N_C^{(i)}$is the number of categories included in the i-th issue. E.g: if the third issue contains 5 categories, $N_C^{(3)}$= 5, and the second category is denoted with the symbol $C_{3,2}$.
- $c_{i,j,k}$, the k-th criterion in the j-th category of the i-th issue, k = 1,……., $N_c^{(i,j)}$, and $N_c^{(i,j)}$is the number of criteria included in $C_{i,j}$. E.g: if the second category includes 7 criteria, $N_C^{(3,2)}$= 7, and the fifth criterion in $C_{3,2}$ is denoted with $c_{3,2,5}$.
- $I_{i,j,k}$, the indicator associated with $c_{i,j,k}$, k = 1,…., $N_c^{(i,j)}$. E.g: the indicator associated with the criterion $c_{3,2,5}$ is denoted with the symbol $I_{3,2,5}$
- $\hat{s}_{i,j,k}$, the numerical values of $I_{i,j,k}$. E.g: the numerical values of the indicator $I_{3,2,5}$ associated with $c_{3,2,5}$ is denoted with $\hat{s}_{3,2,5}$

Note: the symbols above indicated are valid for the mathematical description of the multicriteria assessment system. To improve the understandability of the generic framework, in CESBA ALPS STT GF the issues are indicated with a letter in substitution of the number, where 1=A, 2=B, 3=C, 4=D, 5=E. The consequence is that categories are identified by a letter and a number (i.e. A1, C2, D4) and criteria by a letter and two numbers (i.e. A1.3, C2.4, D4.5).

3.2.1 Characterization step

The first step of the analysis is the characterization step. Characterization is performed by assigning a numerical value to each indicator. Such values are determined starting from design data, experimental measures, and through comparison with reference scenarios (in the case of qualitative criteria).
In the CESBA STT F, for each indicator a specific assessment method has been defined to calculate/evaluate its value.

The output of the characterization step is represented by the set of data: $\hat{s}_{i,j,k}$, $k = 1.....N_c^{(i,j)}$, $j = 1,..., N_C^{(i)}$, $i = 1,...., N_A$, each of them is associated with a criterion, and represents the numerical values of the corresponding indicator.

3.2.2 Normalization step: assignement of a score to indicators' value

The normalization steps consist basically in the assignment of a score to the indicators' value. Due to the diverse nature of criteria, indicator values are characterized by different units of measure and different orders of magnitude. Moreover, indicator values associated with qualitative criteria do not possess any unit of measure as they do not represent any physical quantity. For this reason, indicator values are adimensionalized and rescaled in an interval from -1 to +5 before the aggregation phase.

The normalization method fulfills two basic requirements:

1. indicator values are normalized in the interval [-1, +5], where -1 and +5 are integers, called 'normalization interval'
2. the better the performance, the higher the normalized score.

Normalized scores are computed by applying suitable functions, called '*normalization functions*' to indicator values. These modify indicator values and provide normalized scores which fulfill both the previous requirements.

In the following, these symbols will be used to denote:

- $\varphi_{i,j,k}$, the normalization function associated with the indicator $I_{i,j,k}$;
- $s_{i,j,k}$, the normalized score associated with the criterion $c_{i,j,k}$.

Each normalization function is defined in different ways depending on the criterion which it is associated with. In the *SBEMethod* three main kinds of criteria can be distinguished:

- H.I.B. criteria (*Higher is Better*);
- L.I.B. criteria (*Lower is Better*);
- Qualitative criteria.

H.I.B. Criteria (*Higher Is Better*). All criteria such that the higher the numerical value of the corresponding indicator, the higher the performance level. Since the normalized score must fulfil the requirement "the better the performance, the higher the normalized score", *normalization functions associated with H.I.B. criteria must be increasing functions*.

L.I.B. Criteria (*Lower Is Better*). All criteria such that the lower the numerical value of the corresponding indicator, the higher the performance level. N*ormalization functions associated with L.I.B. criteria must be decreasing functions*.

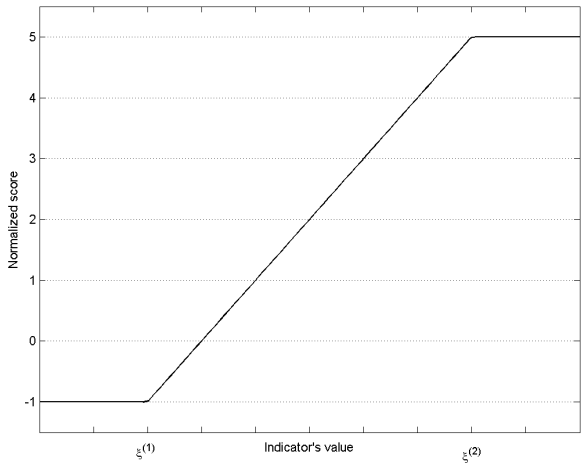
Qualitative criteria. All criteria such that the normalized score can only attain discrete values in the normalization interval, each of them corresponding to a reference scenario defined by the corresponding indicator. Roughly speaking, the normalized score is computed by comparing the territory's performance with some reference scenarios which are defined by the indicator associated with the criterion.

3.2.2.1 Normalization functions for H.I.B. criteria

In the *SBEMethod*, normalization functions for H.I.B. criteria are piecewise linear functions defined as follows:

$$\phi_{i,j,k}\left(\hat{s}_{i,j,k}\right) = \begin{cases} n, & \hat{s}_{i,j,k} \leq \xi^{(1)}_{i,j,k} \\ n + (m-n)\,\dfrac{\hat{s}_{i,j,k} - \xi^{(1)}_{i,j,k}}{\xi^{(2)}_{i,j,k} - \xi^{(1)}_{i,j,k}}, & \xi^{(1)}_{i,j,k} < \hat{s}_{i,j,k} \leq \xi^{(2)}_{i,j,k} \\ m, & \hat{s}_{i,j,k} > \xi^{(2)}_{i,j,k} \end{cases} \quad (1)$$

Normalization function of this kind are such that:



Normalization function for a H.I.B. criterion for the case n = −1 and m = 5

- the normalized score is 'n', if the indicator value lies below the threshold $\xi^{(1)}_{i,j,k}$;
- the normalized score is 'm', if the indicator value lies above the threshold $\xi^{(2)}_{i,j,k}$;
- otherwise the normalized score linearly varies in the interval $\left[\xi^{(1)}_{i,j,k}, \xi^{(2)}_{i,j,k}\right]$.

Remark: Note that the normalization function defined in (1) for a general H.I.B criterion is an increasing function.

The normalization function depends on two parameters: $\xi^{(1)}_{i,j,k}$ and $\xi^{(2)}_{i,j,k}$ which vary from criterion to criterion. Such parameters are called benchmarks in the sense that they respectively represent the threshold for the worst (-1) and the best (+5) performance.

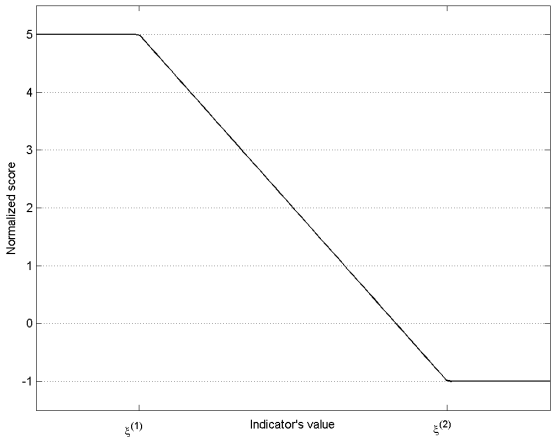
If the numerical values of benchmarks are not available, they are computed starting from some reference values, i.e. two normalized scores (y' and y'') are associated with two values (x' and x'') of the corresponding indicator, and benchmarks are recovered by linear extrapolation:

$$\begin{cases} \dfrac{\xi^{(1)}_{i,j,k} - x'}{x'' - x'} = \dfrac{n - y'}{y'' - y'} \\ \dfrac{\xi^{(2)}_{i,j,k} - x'}{x'' - x'} = \dfrac{m - y'}{y'' - y'} \end{cases} \tag{2}$$

3.2.2.2 Normalization functions for L.I.B. criteria

The same analysis of the previous section can be repeated in the case of normalization function associated with L.I.B. criteria, with the only exception that in this case, the normalization function must be a decreasing function.

$$\phi_{i,j,k}\left(\hat{s}_{i,j,k}\right) = \begin{cases} m, & \hat{s}_{i,j,k} \leq \xi^{(1)}_{i,j,k} \\ m - (m-n)\,\dfrac{\hat{s}_{i,j,k} - \xi^{(1)}_{i,j,k}}{\xi^{(2)}_{i,j,k} - \xi^{(1)}_{i,j,k}}, & \xi^{(1)}_{i,j,k} < \hat{s}_{i,j,k} \leq \xi^{(2)}_{i,j,k} \\ n, & \hat{s}_{i,j,k} > \xi^{(2)}_{i,j,k} \end{cases} \tag{3}$$



Normalization function for a L.I.B. criterion in the case n = −1 and m = 5

Normalization functions of this kind are such that:

- the normalized score is 'm', if the indicator value lies below the threshold $\xi^{(1)}_{i,j,k}$;
- the normalized score is 'n', if the indicator value lies above the threshold $\xi^{(2)}_{i,j,k}$;
- otherwise, the normalized score linearly varies in the interval $\left[\xi^{(1)}_{i,j,k}, \xi^{(2)}_{i,j,k}\right]$.

Remark 2 Note that the normalization function defined in (3) is a decreasing function.

The normalization function depends on two parameters: $\xi^{(1)}_{i,j,k}$ and $\xi^{(2)}_{i,j,k}$ which vary from criterion to criterion. Such parameters are called benchmarks in the sense that they respectively represent the threshold for the best (+5) and worst performance (-1).

Also in the present case, if the benchmarks are not available, they are computed by linear extrapolation:

$$\begin{cases} \dfrac{\xi_{i,j,k}^{(1)} - x'}{x'' - x'} = \dfrac{m - y'}{y'' - y'} \\ \dfrac{\xi_{i,j,k}^{(2)} - x'}{x'' - x'} = \dfrac{n - y'}{y'' - y'} \end{cases} \tag{4}$$

3.2.2.3 Normalization functions for qualitative criteria.

Normalization functions associated with qualitative criteria are defined as follows:

$$\phi\left(\hat{s}_{i,j,k}\right) = \begin{cases} s_0, & x = \xi_{i,j,k}^{(0)} \\ s_1, & x = \xi_{i,j,k}^{(1)} \\ s_2, & x = \xi_{i,j,k}^{(2)} \\ \ldots, & \\ s_n, & x = \xi_{i,j,k}^{(n)} \end{cases} \tag{5}$$

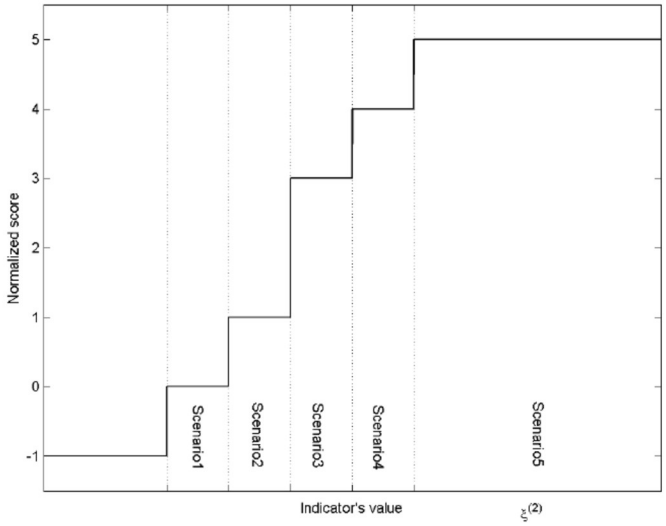
$$s_0, s_1, \ldots, s_n \in [n, m]$$

the normalized score can only attain discrete values in the normalization interval, each of them associated with a reference *scenario* (see, fig. 5).

After *n* + 1 scenarios are defined:

- the normalized score s_0 is associated with the 0-th scenario;
- the normalized score s_1 is associated with the 1-st scenario;
- ...
- the normalized score s_n is associated with the *n*-th scenario;

Then the territory's performance is compared with all reference scenarios and the normalized score is assigned depending on the result of such a comparison.



Example of a normalization function for a qualitative criterion in the case n = −1, m = 5

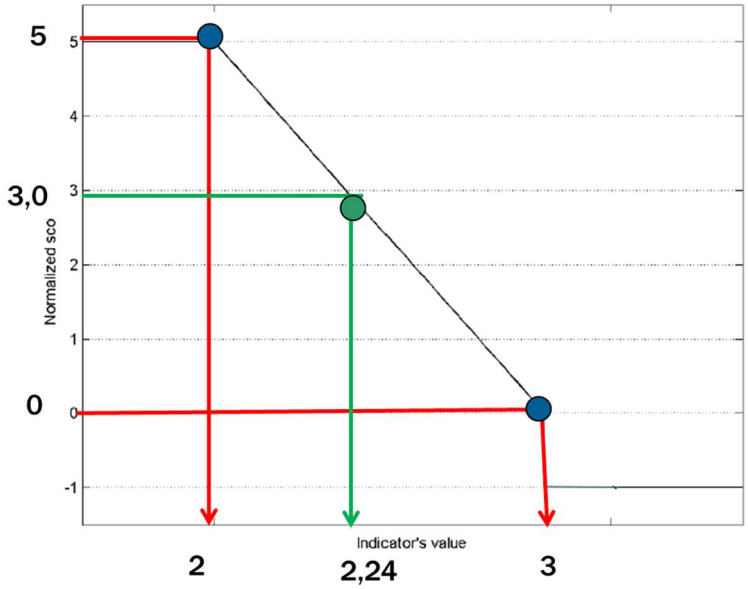
Once all scenarios are defined, normalization functions associated with qualitative criteria only depend on n + 1 tunable parameters, which are the normalized score associated with each scenario ($s_0, \ldots, s_n$).

Example:

Criterion "Final energy consumption"

Normalization of the indicator's value:

- Consumption of energy per inhabitant = 2,24 TEP/inhabitant



Blue dots: represents the minimum acceptable performance (score zero) and the excellent performance (score +5)

Green dot: represents the value of the indicator on the linear performance scale

The results of the normalization for a value of the indicator of 2.24 TEP/inhabitant is a score of 3,0.

3.2.3 Aggregation step

At the end of the normalization step, a new set of data is available, composed of the normalized scores associated with each criterion. Normalized scores are then combined through a series of weighted sums to produce the final score, and this is done in three steps:

- *Aggregation through criteria*: normalized scores associated with all criteria in the same category are aggregated to produce a single score for each category.
- *Aggregation through categories:* normalized score associated with categories in the same issue (these resulting from aggregation through criteria) are further aggregated to produce a single score for each issue.
- *Aggregation through issues*: normalized scores associated with issues (these resulting from aggregation through categories) are aggregated to produce the final concise score.

3.2.3.1 Aggregation through criteria: score of categories

The main goal of aggregation through criteria is to provide a single normalized score for each category. This is computed for each category aggregating the normalized score of all criteria included in that category.
Aggregation is performed by linear aggregation of data through some coefficients, called *weighting factors*. These quantify the relative weight of each criterion with respect to all criteria in the same category.

In the following, these symbols will be used to denote:

- $\omega_{i,j,k}$: *the weighting factor associated with the criterion* $c_{i,j,k}$ *in the category* $C_{i,j}$;
- $S_{i,j}$: *the normalized score resulting from aggregation of criteria included in the category* $C_{i,j}$.

The score $S_{i,j}$ is computed as follows:

$$S_{i,j} = \sum_{k=1}^{N_c^{(i,j)}} \omega_{i,j,k}\, s_{i,j,k} \qquad (6)$$

Note that the weighting factors defined by fulfill the following properties:

- each weighting factor lies in the interval [0, 1];
- $\sum_{k=1}^{N_c^{(i,j)}} \omega_{i,j,k} = 1$

It follows that (6) can be interpreted as a weighted sum of the performance score obtained by the territory in regard of each criterion, i.e. the performance score computed for a given category represents the territory's average performance with respect to all criteria included in that category.
The result of aggregation through criteria is a set of normalized scores, each of them corresponding to a category.

Example: calculation of the score for the category D1 Demography

Code	Criterion	Score	Weight
D1.1	Employment rate of young people (15-24 years old)	3,1	18%
D1.2	Employment rate (20-64 years old)	2,2	18%
D1.3	Balance of migration (immigration flows) over the last 5 years	1,3	18%
D1.4	Unemployment rate	0,5	18%
D1.5	Emigration	1,4	10%
D1.6	Young people neither in employment nor in education or training	3,0	18%

Calculation of the category's score as weighted sum:

Code	Criterion	Score x Weight	Weighted score
D1.1	Employment rate of young people (15-24 years old)	3,1x0,18 =	0,6
D1.2	Employment rate (20-64 years old)	2,2x0,18 =	0,4
D1.3	Balance of migration (immigration flows) over the last 5 years	1,3x0,18 =	0,2
D1.4	Unemployment rate	0,5x0,18 =	0,1
D1.5	Emigration	1,4x0,10 =	0,1
D1.6	Young people neither in employment nor in education or training	3,0x0,18 =	0,5
		TOTAL	**2,0**

$$S_{i,j} = \sum_{k=1}^{N_c^{(i,j)}} \omega_{i,j,k}\, s_{i,j,k}$$

Category score = sum of the weighted scores = 2,0

3.2.3.2 Aggregation through categories

Scores obtained in the previous step are further aggregated to produce a single score for each issue.

In the following, these symbols will be used to denote:

- $w_{i,j}$: *the weighting factors for each category included in the issue* A_i;
- S_{ij}: *the performance score associated with the* A_i.

Aggregation through categories is performed for each issue, combining the performance scores of all categories in that issue as follows:

$$S_i = \sum_{j=1}^{N_C^{(i)}} w_{i,j}\, S_{i,j} \qquad (7)$$

$w_{i,j}$ are the '*categories weighting factors*' which quantify the relative weight of each category with respect to the others in the same issue.

Weighting factors for categories are established by a panel of experts, and fulfill the following properties:

1. each weighting factor lies in the interval $[0, 1]$;
2. $\sum_{j=1}^{N_C^{(i)}} w_{i,j} = 1$

Therefore also (7) can be interpreted as a weighted sum, i.e. the final score obtained for each issue represents the average performance of the territory with respect to all categories included in that issue.

Example: calculation of the score for the issue D Society

Code	Category	Score	Weight
D1	Demography	2,0	30%
D2	Socio-Economic Aspects	1,2	20%
D3	Cultural spects	1,5	30%
D4	Land Use	3,2	10%
D5	Antropogenic risks	2,7	10%

Calculation of the issue's score as weighted sum:

Code	Category	Score x Weight	Weighted score
D1	Demography	2,0 x 0,3 =	0,6
D2	Socio-Economic Aspects	1,2 x 0,2 =	0,2
D3	Cultural spects	1,5 x 0,3 =	0,5
D4	Land Use	3,2 x 0,1 =	0,3
D5	Antropogenic risks	2,7 x 0,1 =	0,3
		TOTAL	**1,9**

$$\mathcal{S}_i = \sum_{j=1}^{N_C^{(i)}} w_{i,j}\, S_{i,j}$$

Issue score = sum of the weighted scores = 1,9

3.2.3.3 Aggregation through issues: overall score of the territory

Finally, scores provided by aggregation through categories are further aggregated to produce the final concise score representing the territory overall performance.
The final score is computed as follows:

$$\Sigma = \sum_{i=1}^{N_A} W_i\, \mathcal{S}_i$$

where W_i represent the '*weighting factors for all issues*' and express the relative influence of each issue on the final score. The weighting factor for each issue is established by a panel of experts and fulfills the following properties:

- Each weighting factor lies in the interval [0, 1];

$$\sum_{i=1}^{N_A} W_i = 1$$

Therefore, the final score can also be interpreted as the average performance of the territory with respect to all issues.

Example: calculation of the overall score for a territory

Code	Issue	Score	Weight
A	Territories and Environment	3,1	20%
B	Energy/Resources consumption	0,9	15%
C	Infrastructures/Services	2,3	10%
D	Society	1,9	30%
E	Economy	2,1	30%

Calculation of the issue's score as weighted sum:

Code	Issue	Score x Weight	Weighted score
D1	Demography	3,1 x 0,2 =	0,6
D2	Socio-Economic Aspects	0,9 x 1,5 =	1,4
D3	Cultural spects	2,3 x 0,1 =	0,2
D4	Land Use	1,9 x 0,3 =	0,6
D5	Antropogenic risks	2,1 x 0,3 =	0,6
		TOTAL	**3,4**

$$\Sigma = \sum_{i=1}^{N_A} W_i \mathcal{S}_i$$

Territorial score = sum of the weighted scores = 3,4

4 Information Module: criteria and indicators

This module provides context related information useful to understand the key characteristics of the territory under assessment. The module is composed by a set of indicators that describe the territory from the point of view of climate, land characteristics, natural risks, demography and renewable energy potential. All these aspects are in general not modifiable and represent an identity card of the territory. The "Information" module doesn't produce a rating score.

List of informative criteria:

I1	**Climate**
I1.1	Annual Mean Temperature
I1.2	Winter Mean Temperature
I1.3	Summer Mean Temperature
I1.4	Frost Days
I1.5	Days of extreme cold
I1.6	Days of extreme heat
I1.7	Anomaly of extreme temperatures
I1.8	Heating Degrees Day (HDD)
I1.9	Heat Stress Index (HSI)
I1.10	Wind
I1.11	Foggy days
I1.12	Rainfall Index
I1.13	Meteorological drought
I1.14	Intense rain events
I1.15	Consecutive days without rain
I1.16	Rainfall anomalies
I1.17	Maximum rainfall
I1.18	Snowfall
I1.19	Snow on the ground: days
I1.20	UV Index
I2	**Land**
I2.1	Average slope
I2.2	Average altitude
I2.3	Geomorphological Aspects
I2.4	Geological and Lithological Aspects
I2.5	Avalanche risk
I2.6	Protected Wetlands
I2.7	Area for agriculture
I2.8	Abandoned areas
I3	**Natural risks**
I3.1	Areas in landslide
I3.2	Seismic activity
I3.3	Avalanche accidents
I3.4	Floodable areas

I4	Demography
I4.1	Inhabitant Population
I4.2	Birth rate
I4.3	Mortality rate (for a thousand inhabitants)
I4.4	Inhabitants Density
I4.5	Fertility Index
I4.6	Oldness Index
I4.7	Life expectancy
I4.8	Share of people < 15 years old
I4.9	Share of people 15 - 60 years old
I4.10	Share of people > 60 years old
I5	**Energy**
I5.1	Potential of renewable energy

4.1 I1- CLIMATE

I1	CLIMATE	
I.1.1	**Annual Mean Temperature**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	Annual mean temperature
	Unit of measure:	°C
	Information sources:	Monitored data, statistic data
	Assessment method:	Calculation in monitoring procedure of the annual average temperature (°C) of the period considered and the average value of the reference climate period (1991-2010)
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_temperatura-media
I.1.2	**Winter Mean Temperature**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	Winter mean temperature
	Unit of measure:	°C
	Information sources:	Monitored data, statistic data
	Assessment method:	Calculation in monitoring procedure of the winter average temperature (°C) of the period considered and the average value of the reference climate period (1991-2010)
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_giorni-di-gelo
I.1.3	**Summer Mean Temperature**	
	Intent:	To evaluate local winter climate conditions and climate change trends
	Indicator:	Summer mean temperature
	Unit of measure:	°C
	Information sources:	Monitored data, statistic data
	Assessment method:	Calculation in monitoring procedure of the summer average temperature (°C) of the period considered and the average value of the reference climate period (1991-2010)
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_giorni-di-gelo

I.1.4	**Frost Days**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	Number of days with minimum temperature below 0 ° C (frost days), anomaly compared to the reference period, number of days without thaw
	Unit of measure:	Number/year
	Information sources:	Monitored data, statistic data
	Assessment method:	Measurements in monitoring procedure, use of statistic data. Option 1 Verification of number of frost days/with minimum temperature < 0 °C in a year Option 2 Verification of number of frost days/with minimum temperature < 0 °C in a year compared to the reference period Option 3 Verification of number of days maximum temperature < 0 °C without thaw in a year
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_giorni-di-gelo
I.1.5	**Days of extreme cold**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	Number of days with the daily minimum temperature < 90° percentile, anomaly compared to the reference period
	Unit of measure:	Number of extreme cold days/year
	Information sources:	Monitored data, statistic data
	Assessment method:	Measurements in monitoring procedure, use of statistic data Option 1 Verification of number of days with the daily minimum temperature < 90° percentile in a year Option 2 Verification of number of days with the daily minimum temperature < 90° percentile anomaly compared to the reference period
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_giorni-di-freddo-intenso

I.1.6	**Days of extreme heat**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	Number of days with the daily maximum temperature > 90° percentile, anomaly compared to the reference period
	Unit of measure:	Number /year
	Information sources:	Monitored data, statistic data
	Assessment method:	Measurements in monitoring procedure, use of statistic data Option 1 Verification of number of days with the daily maximum temperature > 90° percentile in a year Option 2 Verification of number of days with the daily maximum temperature > 90° percentile anomaly compared to the reference period
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_giorni-di-caldo-intenso
I.1.7	**Anomaly of extreme temperatures**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	Annual anomaly in extreme temperatures (Tmin), Annual anomaly in extreme temperatures (Tmax)
	Unit of measure:	°C
	Information sources:	Monitored data, statistic data
	Assessment method:	Measurements in monitoring procedure. Use of statistic data. Calculation of Difference between the Tmin (daily average) of the year and the typical annual mean. Calculation of Difference between the Tmax (daily average) of the year and the typical annual mean
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_analisi-delle-temperature-estreme

I.1.8	**Heating Degrees Day (HDD)**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	Degree Days
	Unit of measure:	°C
	Information sources:	Monitored data, statistic data
	Assessment method:	Measurements in monitoring procedure of external temperature. Calculation of the mean external temperature. Calculation of the summation of the daily difference between the indoor temperature (20°C) and the mean external temperature for the heating period
	Territorial Scale:	All
	Standards or references:	Italian legal reference:DPR412/93 http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_gradi-giorno-di-riscaldamento
I.1.9	**Heat Stress Index (HSI)**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	The estimate of the physiological discomfort of the population due to exposure to weather conditions characterized by temperature and air hygroscopic high levels compared to the reference climatology
	Unit of measure:	Number /year
	Information sources:	Monitored data, statistic data
	Assessment method:	Measurements in monitoring procedure the number of days with HSI>9, use of statistic data Option 1 Verification of the number of days with HSI>9 in a year Option 2 Verification of the number of days with HSI>9 in a year compared to the reference climatology
	Territorial Scale:	All
	Standards or references:	Italian legal reference: Directive of The Prime Minister 27 February 2004, DGR n° 37-15176/2005 http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_heat-stress-index-hsi

I.1.10	**Wind**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	The annual average speed values and maximum annual gust of last year and the mean values calculated for the anemometer operating period
	Unit of measure:	m/s
	Information sources:	Measured data
	Assessment method:	Measurements in monitoring procedure of the wind speed value. Calculation ol the average speed values. Use of statistic data for the calculation of climatological value. The reference values were calculated by averaging the values of average annual speed and maximum gust daily value of each year
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_velocita-media-e-raffica-annua-del-vento
I.1.11	**Foggy days**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	Number of foggy days per year (visibility < 1000 m for 3 consecutives hours)
	Unit of measure:	Number/year
	Information sources:	Measured data
	Assessment method:	Measurements in monitoring procedure. Verification of number of foggy days per year with visibility < 1000 m for 3 consecutives hours
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_giorni-di-nebbia
I.1.12	**Rainfall Index**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	Annual mean amount of rainfall
	Unit of measure:	mm
	Information sources:	Measured data
	Assessment method:	Monitoring procedure (standard World Meteorological Organization WMO) Measurement of the volume of water flowed on the basin through the spatial information of rainfall measured with rain gauges
	Territorial Scale:	Large
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/acqua_precipitazioni WMO https://www.wmo.int/pages/index_en.html

I.1.13	**Meteorological drought**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	Percentage of the territory that suffered a meteorological drought for more than 3 months in a year
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Measurements in monitoring procedure: verification of the territorial area in drought. Calculation of the percentage as a share of the total area
	Territorial Scale:	Large
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_indice-di-siccita-meteorologica-spi
I.1.14	**Intense rain events**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	Number of intense rain events in a year (10 mm / 20 minutes)
	Unit of measure:	Number/year
	Information sources:	Measured data
	Assessment method:	Measurements in monitoring procedure: verification of number of intense rain events in a year (more than 10 mm of rain in 20 minutes)
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_eventi-temporaleschi-intensi
I.1.15	**Consecutive days without rain**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	Number of consecutive days without rainfall in a year
	Unit of measure:	Number
	Information sources:	Measured data
	Assessment method:	Measurements in monitoring procedure. Verification of number of consecutive days without rainfall in a year
	Territorial Scale:	Large
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_giorni-consecutivi-senza-pioggia-ccd

I.1.16	**Rainfall anomalies**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	Difference between the annual rainfall and the typical statistical rainfall (last 10 years)
	Unit of measure:	mm
	Information sources:	Monitored data, statistic data
	Assessment method:	Measurements in monitoring procedure. Use of statistic data. Verification of the annual rainfal. Verification of the typical statistical rainfall (last 10 years). Calculation of difference between the annual rainfall and the typical statistical rainfall (last 10 years)
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_anomalia-precipitazione-totale
I.1.17	**Maximum rainfall**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	Annual Maximum level of rainfall in one hour
	Unit of measure:	mm
	Information sources:	Measured data
	Assessment method:	Measurements in monitoring procedure. Verification of Annual Maximum level of rainfall in one hour.
	Territorial Scale:	all
	Standards or references:	www.arpa.piemonte.gov.it/dati-1
I.1.18	**Snowfall**	
	Intent:	To adopt adaptation measures to climate change
	Indicator:	HN - Annual Total Snowfall
	Unit of measure:	cm
	Information sources:	Measured data
	Assessment method:	Measurements in monitoring procedure. HN - Annual Total Snowfall (Quantities of snowfall referring to 12 representative snow metric station in the Piedmont Alps The HN values are calculated as the difference of snow on the ground between consecutive days to ensure temporal and spatial homogeneity of the analysed variables
	Territorial Scale:	Large
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_precipitazioni-nevose

I.1.19	Snow on the ground: days	
	Intent:	To evaluate local winter climate conditions and climate change trends
	Indicator:	Annual number of days with snow on the ground in relationship with the typical value, increase compared to the reference period. The indicator provides information on the number of days of presence of snow cover, in relation to the seasonal average of the period '81 -'10, of 12 representative snow metric station in the Piedmont Alps
	Unit of measure:	Number, %
	Information sources:	Measured data
	Assessment method:	Option 1 Verification of the number of days with snow on the ground. Option 2 Verification of the number of days with snow on the ground. Calculation of average reference period. Calculation of the percentage of increase in relationship with the reference period
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/clima_giorni-di-permanenza-neve-al-suolo
I.1.20	UV Index	
	Intent:	To minimize the exposition to non ionising radiation
	Indicator:	Global Solar UV Index
	Unit of measure:	UV index
	Information sources:	Measured data
	Assessment method:	The indicator evaluates the intensity of solar UV radiation and its effectiveness in causing erythema. It is a number between 1 and 12
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/pressioni-ambientali/radiazioni-non-ionizzanti_indice-uv-1 WHO. Global solar UV - Index. A practical guide. 2002 http://www.unep.org/PDF/Solar_Index_Guide.pdf; 2002

4.2 I2- LAND

I2	LAND	
I.2.1	**Average slope**	
	Intent:	Evaluate the average slope of the territory
	Indicator:	Slope of the territory
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the average slope of the territory
	Territorial Scale:	All
	Standards or references:	Regione Lombardia, Geoportal
I.2.2	**Average altitude**	
	Intent:	Evaluate the average altitude of the territory
	Indicator:	Altitude of the territory
	Unit of measure:	Meters above sea level
	Information sources:	Measured data
	Assessment method:	Calculate the average altitude of the territory
	Territorial Scale:	All
	Standards or references:	Regione Lombardia, Geoportal
I.2.3	**Geomorphological Aspects**	
	Intent:	To define the landscape sensitivity according to the geomorphological characteristics of the territory
	Indicator:	Morphological units (type, main characters)
	Unit of measure:	n
	Information sources:	Measured data
	Assessment method:	Evaluate morphological units of the territory
	Territorial Scale:	All
	Standards or references:	State of Environment Report and Environmental Indicators - ARPA Piemonte
I.2.4	**Geological and Lithological Aspects**	
	Intent:	To define the dominant matrix of the shaping of the landscape
	Indicator:	Lithological character
	Unit of measure:	-
	Information sources:	Qualitative data
	Assessment method:	Evaluate lithological character
	Territorial Scale:	All
	Standards or references:	State of Environment Report and Environmental Indicators - ARPA Piemonte

I.2.5	**Avalanche risk**	
	Intent:	To reduce risks
	Indicator:	Avalanche area
	Unit of measure:	ha
	Information sources:	Studies
	Assessment method:	Mapped avalanches are the product of an integrated study conducted both by photo interpretation and by territory surveys through the investigation area with the support of witnesses and archive data searches (parish, forest, communal, editorial archives). Work is carried out on three integrated levels: • Locating the avalanche sites by photo-interpretation of summer aerofotograms; • Execution of extensive land surveys throughout investigated territory and collected oral testimonies; • Integration of land data with historical information. This product is updated by the Nivometeo Center of the ARPA of Bormio (SO).
	Territorial Scale:	All
	Standards or references:	Regione Lombardia, Geoportal, Map Localization Probable Avalanche
I.2.6	**Protected Wetlands**	
	Intent:	To improve biodiversity
	Indicator:	Distribution of natural and artificial wetlands on the territory
	Unit of measure:	Number
	Information sources:	Measured data
	Assessment method:	Survey of the geographic data at regional and local level The data comes from the reconnaissance, analysis, evaluation and systematization of the available geographic information useful for the project, both at regional and local level
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/natura-e-biodiversita_stato-e-trend-delle-specie-ornitiche
I.2.7	**Area for agriculture**	
	Intent:	To measure the correlation between space usages
	Indicator:	Percentage of area for agriculture
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the percentage of area for agriculture
	Territorial Scale:	All
	Standards or references:	Marktbericht Landwirtschaft, maps of the municipalities

I.2.8	Abandoned areas	
	Intent:	To revitalize and reclaim abandoned areas
	Indicator:	Surface of abandoned areas (only for anthropized area)
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the ratio between the abandoned areas and total geographical area
	Territorial Scale:	All
	Standards or references:	SIMON – Systema Informativo Monitoraggio PGT - Monitoring Informatic System for Territorial Governance Plans of Lombardy Municipalities

4.3 I3- NATURAL RISKS

I3	NATURAL RISKS	
I.3.1	Areas in landslide	
	Intent:	To protect inhabitants from natural risks
	Indicator:	Extension of areas in landslide
	Unit of measure:	km ^{2}; %
	Information sources:	Data Bank (GIS) provided by Regional and National Institutions
	Assessment method:	Option 1 Calculation of the landslide areas(km ^{2}) Option 2 Calculation of the landslide areas(km ^{2}). Calculation of total mountainous/hilly area (slope >4°). Calculation of the percentage of the areas in landslide respect to the total mountainous/hilly area
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/pressioni-ambientali/rischi-naturali_aree-in-frana ISPRA http://www.progettoiffi.isprambiente.it/cartanetiffi/

I.3.2	**Seismic activity**	
	Intent:	To protect inhabitants from natural risks
	Indicator:	Number of seismic events
	Unit of measure:	Number
	Information sources:	Measured data
	Assessment method:	Measurements in monitoring procedure by legal framework
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/pressioni-ambientali/rischi-naturali_attivita-sismiche
I.3.3	**Avalanche accidents**	
	Intent:	To protect inhabitants from natural risks
	Indicator:	Number of avalanche accidents, people caught in the accident, number of victims
	Unit of measure:	Number/year
	Information sources:	Measured data
	Assessment method:	Measurements in monitoring procedure. Option 1 Verification of the number avalanche accidents. Option 2 Verification of the number of people caught in the accident. Option 3 Verification of the number of victims
	Territorial Scale:	Large
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/pressioni-ambientali/rischi-naturali_incidenti-e-vittime-da-valanga
I.3.4	**Floodable areas**	
	Intent:	To protect inhabitants from natural risks
	Indicator:	The indicator provides information about the areas affected by flooding and alluvionament by the primary and secondary network
	Unit of measure:	km2; %
	Information sources:	Monitored data
	Assessment method:	Option 1 Verification of the floodable area (Km2) Option 2 Verification of the floodable area (Km2). Calculation of the percentage of the floodable area in relationship to the provincial area .
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/pressioni-ambientali/rischi-naturali_aree-soggette-a-dinamiche-fluviali

4.4 I4- DEMOGRAPHY

I4	DEMOGRAPHY	
I.4.1	**Inhabitant Population**	
	Intent:	Evaluate the number of people living in a selected territory surface
	Indicator:	Human density
	Unit of measure:	n/km2
	Information sources:	Statistic data
	Assessment method:	Calculate the ratio between people living in the selected territory and the total municipal area
	Territorial Scale:	All
	Standards or references:	ISTAT, Municipal civil registry offices, CSTB - Urban Morphology Laboratory
I.4.2	**Birth rate**	
	Intent:	To assess the growth / decline of the population
	Indicator:	Birth rate per thousand inhabitants
	Unit of measure:	number/1.000 inhabitants
	Information sources:	Statistic data on population
	Assessment method:	Verification of the number of live births in a year in a territory. Verification of the number of inhabitants living in the territory. Calculation of the ratio between number of live births in a year per 1.000 inhabitants
	Territorial Scale:	All
	Standards or references:	http://www.ruparpiemonte.it/infostat/filtri.jsp?idReport=MA_TAB_VA
I.4.3	**Mortality rate (for a thousand inhabitants)**	
	Intent:	To assess the growth / decline of the population
	Indicator:	Mortality rate per thousand inhabitants
	Unit of measure:	number/1.000 inhabitants
	Information sources:	Statistic data on population (number of deaths per thousand inhabitants)
	Assessment method:	Verification of the number of inhabitants living in the territory. Calculation of the ratio between number of deaths in a year per 1.000 inhabitants
	Territorial Scale:	All
	Standards or references:	http://www.ruparpiemonte.it/infostat/filtri.jsp?idReport=MA_TAB_VA

I.4.4	**Inhabitants Density**	
	Intent:	To know the inhabitants density of the territory
	Indicator:	Number of inhabitants per area
	Unit of measure:	number/Km2*year
	Information sources:	Statistic data on population
	Assessment method:	Verification of the number of inhabitants in a year in a territory. Calculation of the ratio between number of inhabitants per area
	Territorial Scale:	All
	Standards or references:	http://www.ruparpiemonte.it/infostat/filtri.jsp?idReport=MA_TAB_VA
I.4.5	**Fertility Index**	
	Intent:	To know the demographic trend
	Indicator:	Ration between number of live births and women of childbearing age
	Unit of measure:	number/number
	Information sources:	Statistic data on population, MADEsmart
	Assessment method:	Verification of the number of live births in a year in a territory. Verification of the number of women of childbearing age (between 15 and 49 years) living in the territory. Calculation of the ratio between number of live births in a year and the number of women of childbearing age
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/qualita-della-vita/inquadramento-socio-economico_indice-di-fertilita
I.4.6	**Oldness Index**	
	Intent:	To estimate the aging degree of the population
	Indicator:	Ratio between old (>65) and young (<14) inhabitants
	Unit of measure:	number/number*year
	Information sources:	Statistic data on population, MADEsmart
	Assessment method:	Verification of the number of inhabitant(> 65 years) in a year in a territory. Verification of the number of number of inhabitant (< 14 year) living in the territory. Calculation of the ratio between the number of inhabitant(> 65 years) and the number of number of inhabitant (< 14 year)childbearing age
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/qualita-della-vita/inquadramento-socio-economico_indice-di-vecchiaia

I.4.7	**Life expectancy**	
	Intent:	To show the health state of the population
	Indicator:	Life expectancy at birth
	Unit of measure:	Number of years
	Information sources:	Statistical data
	Assessment method:	Calculations based on Life tables that show intensity of dying and age distribution. Calculated values are comparable in time and space
	Territorial Scale:	Large
	Standards or references:	Statistical Office of Republic of Slovenia, Eurostat, Statistical Offices
I.4.8	**Share of people < 15 years old**	
	Intent:	To monitor the share of people in young age
	Indicator:	Percent of people younger than 15 years old
	Unit of measure:	%
	Information sources:	Statistical data
	Assessment method:	Check via statistic office the number of people younger than 15 and relate them to the total number of people in the municipality
	Territorial Scale:	Small / Municipality or part of Municipality
	Standards or references:	Statistic office
I.4.9	**Share of people 15 - 60 years old**	
	Intent:	To monitor the share of people in the age between 15 and 60 years old
	Indicator:	Percent of people between 15 and 60 years old
	Unit of measure:	%
	Information sources:	Statistical data
	Assessment method:	Check via statistic office the number of people between 15 and 60 years old and relate them to the total number of people in the municipality
	Territorial Scale:	Small / Municipality or part of municipality
	Standards or references:	Statistic office
I.4.10	**Share of people > 60 years old**	
	Intent:	To monitor the share of people in old age
	Indicator:	Percent of people older than 60 years
	Unit of measure:	%
	Information sources:	Statistical data
	Assessment method:	Check via statistic office the number of people older than 60 years and relate them to the total number of people in the municipality
	Territorial Scale:	Small / Municipality or part of municipality
	Standards or references:	Statistic office

4.5 I5- ENERGY

I5	ENERGY	
I.5.1	**Potential of renewable energy**	
	Intent:	Ideal utilization of renewable energy sources
	Indicator:	Renewable energy potentially available and utilisable
	Unit of measure:	MWh / km² a
	Information sources:	Calculated data
	Assessment method:	Identification of renewable energy sources (accessible, economically reasonable), scenario planning with established energy technology choices
	Territorial Scale:	All
	Standards or references:	German renewable potential Atlas: https://unendlich-viel-energie.de/media/file/319.Potenzialatlas_2_Auflage_Online.pdf Wind and Solar-Atlas, Renewable energy potential investigations

5 Capacity to Act Module: criteria and indicators

The “Capacity to Act” module is useful to evaluate the effectiveness and quality of local policies and processes in terms of participation and governance. It contains 28 criteria. Each of them is associated to an indicator, quantitative or qualitative, that allows to measure the performance reached by the territory.

On the base of indicators’ value, the Capacity to Act module produces performance scores and rating. The assessment method is described in Chapter 3 “CESBA Alps Assessment Methodology”.

P1	Partecipation and governance
P1.1	Integration of energy issues in planning documents
P1.2	Land use policy tools against urban sprawl and urban scattering
P1.3	Public participation processes
P1.4	Social climate
P1.5	Sustainable urban planning
P1.6	Territorial tools to support sustainable construction
P1.7	Territorial policy with clear objectives
P1.8	Sustainable construction assessment system
P1.9	Involement of local actors in the local governance and activities
P1.10	Monitoring of the satisfaction of buildings users
P1.11	Disaster preparedness
P1.12	Climate change adaption
P1.13	Use of recycled materials
P1.14	Use of eco/local/recycled materials
P1.15	Rate of sustainable development traning for the elected Representatives and communities employess
P1.16	Information and communication campaigns for large audience
P1.17	Support to eco/local material value chain
P1.18	Ensuring/securing drinking water sources
P1.19	Compensation and storage of CO2
P1.20	Protection from natural hazards
P1.21	Waste prevention or cascading use
P1.22	Electric vehicles / Infrastructures
P1.23	Organisation of energy networks
P1.24	Public support to local economy
P1.25	Actions of promotion of the social and solidarity economy
P1.26	Energy improvement of the building stock of modest people
P1.27	Ensuring/securing quality of cultural landscape
P1.28	Air quality monitoring stations

5.1 P1- PARTECIPATION AND GOVERNANCE

P1	PARTECIPATION AND GOVERNANCE	
P.1.1	**Integration of energy issues in planning documents**	
	Intent:	To encourage the integration of energy issues in the legal planning documents
	Indicator:	Public lighting and urban furniture consumption
	Unit of measure:	kWh/inhabitant
	Information sources:	Monitored data from the distribution grid and energy supplier, and general census for the population data (provided by the national institute for statistic INSEE for France)
	Assessment method:	Energy consumption for public lighting and urban furnitures / total number of inhabitant
	Territorial Scale:	Small
	Standards or references:	State Department on energy and housing, Regional scheme for energy efficiency (SRCAE in French) Local energy and climate planning documents (PCET in France equivalent to SEAP - sustainable energy action plan)
P.1.2	**Land use policy tools against urban sprawl and urban scattering**	
	Intent:	To preserve natural area and landscape
	Indicator:	Already built up areas and areas to be urbanised
	Unit of measure:	ha/inhabitant
	Information sources:	Local land use master plan and INSEE data from the general census for the population data (provided by the national institute for statistic INSEE for France)
	Assessment method:	(Already built up areas + areas to be urbanised in planning documents)/total number of inhabitants
	Territorial Scale:	Small
	Standards or references:	Studies from the local urban agency of Marseille AGAM

P.1.3	Public participation processes	
	Intent:	Strengthening public participation/commitment
	Indicator:	Number of people who participate in processes
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Evaluate, through survey with questions about commitment in associations/clubs, etc., people committing in associations related to the total number of inhabitants
	Territorial Scale:	All
	Standards or references:	Survey about volunteer commitment: http://www.vorarlberg.at/vorarlberg/umwelt_zukunft/zukunft/buerofuerzukunftsfragen/weitereinformationen/buergerschaftlichesengage/vorarlbergueberblick/neuestudiezumthema_buerge.htm Questionnaire done by governmental institutions
P.1.4	**Social climate**	
	Intent:	To show the democratic development and the development of relations in society
	Indicator:	Trust in institutions
	Unit of measure:	%
	Information sources:	Statistical data (based on surveys)
	Assessment method:	Surveying with question about trust for several national and European institutions. Three possible answers - Tend to trust, Tend not to trust, Don't know
	Territorial Scale:	Large
	Standards or references:	Eurobarometer
P.1.5	**Sustainable urban planning**	
	Intent:	To assess the sustainability of the urban planning and management
	Indicator:	Number of documents of urban planning that include sustainable development aspects in a practical and prospective vision
	Unit of measure:	Number
	Information sources:	Collection of documents
	Assessment method:	List of urban documents existing on a territory. : 1 point for each significant document
	Territorial Scale:	All
	Standards or references:	CCL CESBA ALPS

P.1.6	Territorial tools to support sustainable construction	
	Intent:	To assess the capacity to act of the territory in the field of sustainable construction
	Indicator:	Number of projects using a territorial assistance service dedicated to sustainable construction : Local energy agency, advisory service for municipalities, advisory service for private owners
	Unit of measure:	Number
	Information sources:	Advisory services annual reports
	Assessment method:	Collect and analyse the assistance services annual report. If possible separate private and public buildings.
	Territorial Scale:	Large
	Standards or references:	CLER TEPOS (French network for the energy transition, Working group for positive energy territories)

P.1.7	Territorial policy with clear objectives	
	Intent:	To assess the translation of the political view in policies
	Indicator:	Policies with clear objectives and evaluation monitoring : Energy Positives Territory approach, Sustainable Energy Actions Plans, Local and planning codes
	Unit of measure:	Y/N
	Information sources:	Collection of significant Local policies
	Assessment method:	Evaluate the number of territorial policies, 0 point if no
	Territorial Scale:	Large
	Standards or references:	CLER TEPOS (French network for the energy transition, Working group for positive energy territories)

P.1.8	Sustainable construction assessment system	
	Intent:	To assess the capacity to act of the territory in the field of sustainable construction
	Indicator:	Projects using a sustainable assessment system
	Unit of measure:	%
	Information sources:	Assessment system monitoring and statistics of projects (construction/renovation authorizations)
	Assessment method:	Divide the number of projects in construction phase per year by the number of assessed projects ==> 1 point per percent
	Territorial Scale:	All
	Standards or references:	HQE²R

P.1.9	Involvement of local actors in the local governance and activities	
	Intent:	To assess the involvement of citizens and SME's to the local life
	Indicator:	Citizens and SME's involved in awareness actions
	Unit of measure:	Number
	Information sources:	Calculated data (list of actions and participants)
	Assessment method:	Calculate the number of citizens and SME's involved in awareness actions (if possible separate the number of participants in public, private and citizen involvement categories)
	Territorial Scale:	All
	Standards or references:	Livre HQE²R

P.1.10	Monitoring of the satisfaction of buildings users	
	Intent:	To assess the building users satisfaction
	Indicator:	Vacancy in main homes
	Unit of measure:	%
	Information sources:	Local/regional statistics, studies
	Assessment method:	Standardised method to evaluate the vacancy of houses
	Territorial Scale:	All
	Standards or references:	CCL CESBA ALPS

P.1.11	Disaster preparedness	
	Intent:	Ensuring disaster relief knowledge in municipality
	Indicator:	Annual participants of a municipality in a disaster relief training
	Unit of measure:	inhabitants / 1000 inhabitants *a
	Information sources:	Calculated data
	Assessment method:	Evaluate the annual participants of a municipality in a disaster relief training over 1000 inhabitants, using record course participants
	Territorial Scale:	All
	Standards or references:	Government Safety Website, Training program: https://www.vorarlberg.at/vorarlberg/sicherheit_inneres/sicherheit/landeswarnzentrale/weitereinformationen/lwz_landeswarnzentrale_/katastrophenschutz/schulungs-undkursaktivita.htm Training program information, municipality records

P.1.12	Climate change adaption	
	Intent:	To deal with climate change and plan and track measures early enough to protect inhabitants but also to use chances
	Indicator:	Number of measures municipalities track
	Unit of measure:	x measures / 1000 inhabitants
	Information sources:	Calculated data
	Assessment method:	Calculate the number of measures municipalities track through Record tracked measures
	Territorial Scale:	All
	Standards or references:	Government climate change adaption action plan: https://www.vorarlberg.at/vorarlberg/umwelt_zukunft/umwelt/natur-undumweltschutz/weitereinformationen/klimaschutz/aktionsplanklimawandelanp.htm Municipalities climate change adaption track plan

P.1.13	Use of recycled materials	
	Intent:	To assess the efforts made on the territory to promote the use of recycled materials in the building sector
	Indicator:	Number of policies and actions toward sustainable buildings that includes a specific part to promote recycled materials
	Unit of measure:	Number
	Information sources:	Urban codes, buildings assessment tools, call for tenders recommendations
	Assessment method:	List of the policies and actions possible on a territorry and their detailed content : 1 point for each policy or territorial action that includes a significant part dedicated to the promotion of recycled material
	Territorial Scale:	All
	Standards or references:	HQE²R, ISDIS

P.1.14	Use of eco/local/recycled materials	
	Intent:	To assess the efforts made on the territory to promote the use of ecological and local materials in the building sector
	Indicator:	Number of policies and actions towards sustainable buildings that includes a specific part to promote local and ecological materials
	Unit of measure:	Number
	Information sources:	Urban codes, buildings assessment tools, call for tenders recommendations
	Assessment method:	List of the policies and actions possible on a territory and their detailed content : Analyse of the documents searching for significant elements ==> 1 point for each policy or territorial action that includes a promotion of local and ecological materials
	Territorial Scale:	All
	Standards or references:	CCL CESBA ALPS

P.1.15	Rate of sustainable development training for the elected Representatives and communities employess	
	Intent:	To inform and raise awareness of local authorities from representatives to technicians on sustainable development
	Indicator:	Training of local authorities on sustainable development
	Unit of measure:	%
	Information sources:	Human resources services of local authorities, sustainable development services of local authorities, local training institute for local authorities
	Assessment method:	(number of trained agents and elected representatives/total number of agents and representatives)*100
	Territorial Scale:	All
	Standards or references:	Local Energy and Climate Action Plan (PCAET in French equivalent to SEAP - sustainable energy action plan) and Agenda 21

P.1.16	Information and communication campaigns for large audience	
	Intent:	To promote and raise awareness of inhabitants on sustainable development
	Indicator:	Information campaigns
	Unit of measure:	Number of events organised on sustainable development by local authorities and their partners
	Information sources:	Local authorities, partners (local energy agencies…)
	Assessment method:	Sum of all sustainable development related events for the public
	Territorial Scale:	Large
	Standards or references:	Regional scheme for energy (SRCAE) and local energy and climate action plan (PCAET in French equivalent to SEAP - sustainable energy action plan) and Agenda 21

P.1.17	Support to eco/local material value chain	
	Intent:	To assess the promotion of eco/local materials and their value chain
	Indicator:	Actions carried out to increase the value chain of eco/local products
	Unit of measure:	Number
	Information sources:	Calculated data (collection of local actions)
	Assessment method:	List of possible actions. Evaluation of the significance of the actions.==> 1 point per significant action
	Territorial Scale:	Large
	Standards or references:	Verdura

P.1.18	Ensuring/securing drinking water sources	
	Intent:	Sustainable usage/treatment of drinking water sources
	Indicator:	Drinking water sources with a protection zone
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the number of driking water sources with (sufficiently dimensioned) in relation to protection zone
	Territorial Scale:	All
	Standards or references:	Governmental water management: https://www.vorarlberg.at/vorarlberg/wasser_energie/wasser/wasserwirtschaft/weiterein formationen/service/publikationen/fachberichte/wasserwirtschafts-strateg.htm Water management report

P.1.19	Compensation and storage of CO2	
	Intent:	To lower CO2 concentration in the atmosphere
	Indicator:	CO2 compensated or stored by public sector and enterprise alliances through set measures or payment
	Unit of measure:	t CO^2 / inhabitant
	Information sources:	Calculated data
	Assessment method:	Calculate the tons of CO2 compensated or stored by public sector and enterprise alliances through set measures or payment related to total number of inhabitants, using standardized CO2 compensation calculation
	Territorial Scale:	Large
	Standards or references:	Governmental funded climate protection organisation: https://www.climateaustria.at/projekte.html Climate protection project record

P.1.20	Protection from natural hazards	
	Intent:	To keep death toll and number of injuries as low as possible in case of natural hazards
	Indicator:	Share of people living in "HQ-territory"
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the number of households in natural hazard zones related to flood zone (HQ zone) times the registered people in the household
	Territorial Scale:	All
	Standards or references:	Hazard zone plan: https://www.bmlfuw.gv.at/forst/oesterreich-wald/raumplanung/gefahrenzonenplan.html Natural hazard plan

P.1.21	Waste prevention or cascading use	
	Intent:	To assess how a community performs in terms of waste avoidance and therefor reduces the need of waste treatment facilities / landfills
	Indicator:	Mass of waste per person and year; share of waste used for up-/re-/down-cycling
	Unit of measure:	Kg/year; %
	Information sources:	Statistic data
	Assessment method:	Statistical values of environment division, compare to previous year, evaluate set measures (like prevention/reuse-initiatives, trainings etc), set new measures
	Territorial Scale:	Large
	Standards or references:	Waste management report: https://www.vorarlberg.at/vorarlberg/umwelt_zukunft/umwelt/abfallwirtschaft/neuigkeiten_mitbild_/vorarlbergerlandes-abfall.htm Environment division, garbage collection company in municipality
P.1.22	Electric vehicles / Infrastructures	
	Intent:	To reduce emissions / resource consumption from transportation
	Indicator:	Number of projects
	Unit of measure:	Number
	Information sources:	Measured data
	Assessment method:	Calculate the number of projects (public electricity stations, regional mobility management, shared spaces...)
	Territorial Scale:	All
	Standards or references:	Deutsche Gesellschaft Nachhaltiges Bauen - Nutzungsprofil Stadtquartiere, Plans of the municipalities
P.1.23	Organisation of energy networks	
	Intent:	To assess the sustainable planification and management of the energy networks : electricity, gas and district heating
	Indicator:	Sustainable planification
	Unit of measure:	Y/N
	Information sources:	Planification documents for gas, electricity and district heating networks
	Assessment method:	Analyse of the planification documents searching for significant sustainable criteria. For example priority to renewable production for district heating operation or complementarity/competition between networks study or planification includes a decreasing consumption perspective or planification includes a RES production potential study or biogaz injection in gas network ==> Y/N for electricity, gas or heating networks
	Territorial Scale:	Large
	Standards or references:	CLER TEPOS (french network for the energy transition, Working group for positive energy territories)

P.1.24	Public support to local economy	
	Intent:	To maintain local economy through services provided by local authorities
	Indicator:	Multi services facilities
	Unit of measure:	Unit
	Information sources:	data or statistic from local authorities
	Assessment method:	Number of cities providing multiservices facilities for companies / total number of cities
	Territorial Scale:	Large
	Standards or references:	Agenda 21
P.1.25	Actions of promotion of the social and solidarity economy	
	Intent:	To assess the dynamic of the territory to reduce its vulnerability and mobilize its internal resources
	Indicator:	Study or monitoring
	Unit of measure:	Number
	Information sources:	Subsidies and list of actions carried out on the territory
	Assessment method:	Collection of significant initiatives and actions in the field of social and solidarity economy. 1 point for each significant action
	Territorial Scale:	All
	Standards or references:	CCL CESBA ALPS
P.1.26	Energy improvement of the building stock of modest people	
	Intent:	To assess the efforts of the territory to reduce fuel poverty
	Indicator:	Dwellings of modest people renovated
	Unit of measure:	Number
	Information sources:	Calculated data
	Assessment method:	Calculate the number of housing renovation project with subsidies for modest people (list of policies and subsidies concerning modest people)
	Territorial Scale:	Large
	Standards or references:	Cera (Regional Economic observatory in Rhône Alps), local monitoring, statistics, subsidies form state, counties and local authorities

P1.27	Ensuring/securing quality of cultural landscape	
	Intent:	To preserve quality of cultural landscape
	Indicator:	Number of measures to preserve quality of cultural landscape
	Unit of measure:	x measures / 1000 people
	Information sources:	Statistic data
	Assessment method:	Evaluate the number of measures to preserve quality of cultural landscape, recording cultural landscape preservation measures
	Territorial Scale:	Large
	Standards or references:	Funds for cultural landscape: https://www.vorarlberg.at/vorarlberg/seiten/foerderungen/kulturlandschaft.htm

P1.28	Air quality monitoring stations	
	Intent:	To monitoring the quality of the air
	Indicator:	Monitoring air quality
	Unit of measure:	n
	Information sources:	Measured data
	Assessment method:	Evaluate the number of monitoring station of the air quality in the territory (number per 100.000 inhabitants)
	Territorial Scale:	All
	Standards or references:	ISTAT Statistical National Institute (Italy)

6 Territorial Performance Assessment Module: criteria and indicators

The "Territorial Performance Assessment" (TPA) module allows to measure the performance reached by a territory with regards to 5 main issues:

- A - Territories and Environment
- B - Energy and Resources
- C - Infrastructures and Services
- D – Society
- E - Economy.

The module contains more than 259 assessment criteria and relative indicators organized in 31 categories. All criteria measure an objective performance on the base of a specific assessment method.

On the base of indicators' value, the TPA module produces performance scores and ratings at the level of criteria, categories and issues. The assessment method is described in Chapter 3 "CESBA Alps Assessment Methodology".

List of criteria:

A	TERRITORIES AND ENVIRONMENT
A1	**Land**
A1.1	Vulnerability of the landscape-environ. system due to the fragmentation produced by linear infrastructure
A1.2	Forest Area
A1.3	Soil erosion by water
A1.4	Quarries
A1.5	Ability to lower atmospheric greenhouse gas concentrations through bio-sequestration
A1.6	Carbon storage in forest
A1.7	Carbon Storage in soil
A2	**Water Quality**
A2.1	Environmental State of Watercourses
A2.2	Surface water bodies (rivers and lakes): ecological status
A2.3	Surface water bodies (rivers and lakes): chemical status
A2.4	Groundwater: punctual chemical status
A2.5	Groundwater: GWB chemical status
A2.6	Surface water quality
A2.7	Water quality in rivers

A3	Nature and Biodiversity
A3.1	Woodland
A3.2	Areas of natural interest
A3.3	Any wetlands
A3.4	Habitats in Natura 2000
A3.5	Amphibian species
A3.6	Fish species
A3.7	Sustainable Forestry
A3.8	Ecological network
A3.9	Endangered species
A3.10	Fragmentation of natural and semi-natural areas
A3.11	Ecological diversity
A3.12	Distribution of woodland plant species
A3.13	Target species
A3.14	Common bird index
A4	**Landscape**
A4.1	Panoramic roads and historical paths
A4.2	Panoramic and scenic view points
A4.3	Areas available for construction
A4.4	UNESCO Sites
A4.5	Geosites
A4.6	Protected cultural heritage
A4.7	Traditional Agriculture elements
A4.8	Index of landscape visibility
A4.9	Landscape perception variation
A4.10	Landscape heritage conservation status
A5	**Waste**
A5.1	Urban solid waste production (not separed)
A5.2	Separate collection of waste
A5.3	Special waste management
A5.4	Production of special waste (not dangerous)
A5.5	Production of special waste (dangerous)
A5.6	Recycling rate of municipal waste
A5.7	Tourism impact on waste
A6	**Effluents**
A6.1	Nitrogen concentration in groundwater
A6.2	Phytosanitary vulnerability
A7	**Contaminated Land**
A7.1	Decontaminated sites
A7.2	Density of contaminated sites
A7.3	Contaminated land with regards to inhabitants

A8	Emissions
A8.1	GHG emissions from all (energetic and chemical/cement/steel) processes
A8.2	GHG emission from energetic processes: mobility
A8.3	GHG emission from energetic processes: tertiary sector
A8.4	GHG emission from energetic processes: residential sector
A8.5	GHG emission from energetic processes: industrial sector
A8.6	GHG emission from energetic processes: agricultural sector
A8.7	Emissions of ozone-depleting substances
A8.8	Emissions of acidifying substances
A8.9	Emissions of photo-oxidants
A9	**Quality of air**
A9.1	PM10 number of exceeded daily average
A9.2	Air quality - Concentration of PM2.5
A9.3	Air quality - Concentration of O3
A9.4	Air quality - Concentration of Benzo(a)pyren B(a)P
A9.5	Asbestos roofing
A9.6	Asbestos concentration in the outdoor air
A9.7	Exposure to air pollution
A10	**Exposure to non ionising radiation**
A10.1	Exposure to ELF Electromagnetic emissions
A10.2	Exposure to RF-MV Electromagnetic emissions
A11	**Exposure to ionising radiations**
A11.1	Indoor exposure to Radon
A11.2	Cesium 137 concentration
A12	**Exposure to noise**
A12.1	Exposure to traffic noise
A12.2	Exposure to and annoyance by traffic noise
A13	**Industrial azards**
A13.1	High risk plants and factories
A13.2	Monitoring of High risk plants and factories

B	ENERGY/RESOURCES CONSUMPTION
B1	**Energy Consumptions**
B1.1	Final Energy Consumes
B1.2	Final Energy consumptions: tertiary sector
B1.3	Final Energy consumption: residential sector
B1.4	Final Energy consumptions: industrial sector
B1.5	Final Energy consumptions: agricultural sector
B1.6	Final Energy consumptions: mobility
B1.7	Energy consumption of public buildings
B1.8	Petroleum products sold
B1.9	Electric Energy consumptions: tertiary sector
B1.10	Electric Energy consumption: residential sector
B1.11	Electric Energy consumptions: industrial sector
B1.12	Electric Energy consumptions: agricultural sector
B1.13	Electric Energy consumptions: mobility sector
B1.14	Electric Energy consumptions in urban areas
B1.15	Thermal energy consumption: private buildings
B1.16	Thermal energy consumption: public buildings
B1.17	Thermal energy consumption: industrial buildings
B1.18	Winter sports energy consumption
B1.19	Degree of renewable energy consumed (% of total consumption)
B1.20	Efficiency in energy use in existing residential buildings
B1.21	Efficiency in energy use in existing non residential buildings
B2	**Sustainable energy**
B2.1	Renewable energy locally produced
B2.2	Production Power by Wind
B2.3	Production Power by Water
B2.4	Heat by Biomass
B2.5	Heat by solarthermal sources
B2.6	Heat by geothermal sources
B2.7	Energetic balance of primary energy
B2.8	PV production
B2.9	Biogas production
B2.10	Energy productivity
B3	**Water Consumption**
B3.1	Consumption of water – Human uses
B3.2	Consumption of water for Agriculture– Non human uses
B3.3	Winter sports water consumption

B4	**Land and building stock use**
B4.1	Efficiency in the use of existing residential building
B4.2	Efficiency in the use of existing non residential building
B4.3	Land use
B4.4	Consumption of soil resulting from sealing
B4.5	Level of settlement
B4.6	Intensity of land use
B4.7	Vulnerability of agricultural soil
B4.8	Urbanized area
B4.9	Urbanisable area
B4.10	Land consumption
B4.11	Sprawl
B4.12	Impact area of land use
B4.13	Land consumption by infrastructures
B4.14	Index of reversible soil consumption
B4.15	Index of total soil consumption
B4.16	Life cycle analysis
C	**INFRASTRUCTURES/SERVICES**
C1	**Mobility**
C1.1	Access to public transportation
C1.2	Performance of the public transport
C1.3	Quality of walkways for pedestrian use
C1.4	Car ownership
C1.5	Transport on demand service
C1.6	Electricity dispensing systems
C1.7	Methane fuel dispensing systems
C1.8	Number of dispensing systems
C1.9	Road Safety
C1.10	Linear infrastructures for mobility
C1.11	Modal split of public transport
C1.12	Critical infrastructures
C1.13	Car sharing
C1.14	Social tariff and gratuity and free of charge transportation
C2	**Leisure Services**
C2.1	Free time facilities
C2.2	Leisure- and recreation-space for settlement area
C3	**Health services**
C3.1	Coverage ratio of emergency services
C3.2	Number of doctors in the territory
C3.3	Housing for elderly people
C3.4	Medical provision
C4	**Education**
C4.1	Presence of a school transport vehicles
C4.2	Educational farms

C5	Efficiency of infrastructures
C5.1	District heating density
C5.2	District heating network
C5.3	Efficiency in the distribution of water for human consumption
C5.4	Flexible energy capacity
C6	**Information and communication**
C6.1	Broadband supply
C6.2	Cell phone connection
C6.3	Ultra-wide band supply
C7	**Basis-Infrastructure**
C7.1	Sewerage connection degree
C7.2	Sewerage system size
C7.3	Sewerage system condition
C7.4	Street lighting network size

D	SOCIETY
D1	**Demography**
D1.1	Employment rate of young people (15-24 years old)
D1.2	Employment rate (20-64 years old)
D1.3	Balance of migration (immigration flows) over the last 5 years
D1.4	Unemployment rate
D1.5	Emigration
D1.6	Young people neither in employment nor in education or training
D2	**Socio-Economic Aspects**
D2.1	Accessibility of disabled people to social housing
D2.2	Evaluation of the fuel poverty
D2.3	Poverty and social exclusion
D2.4	Quality of life - Satisfaction
D2.5	Rate of reported robberies
D2.6	Commuter balance
D2.7	Satisfaction with time distribution
D2.8	Urban/ rural classification
D2.9	Share of social housing in the territory
D2.10	Part of unacceptable and substandard housing in the territory
D2.11	Social water tariff
D2.12	Wage differences between women and men
D2.13	Recipients of economic social assistance
D2.14	Education
D2.15	Environmental education
D2.16	Level of school dropout
D2.17	Rate of university graduate
D2.18	Rate of high school graduate
D2.19	Occupation by gender
D2.20	Gross Income
D2.21	Affordability of residential rental or cost levels
D2.22	Property of the population and economic security
D2.23	Improvement of the building stock of lower income people
D2.24	Early leavers from education and training
D2.25	Poverty and social exclusion
D3	**Cutural aspects**
D3.1	Degree of promotion of the cultural offer of the State Institutes
D3.2	Degree of diffusion of theater and musical shows
D3.3	Cultural institutions
D3.4	Public libraries
D3.5	Cultural heritage enhancement
D4	**Land Use**
D4.1	Plan of land use
D4.2	Green urban areas

D5	**Antropogenetic risks**
D5.1	Forest fire risk
D5.2	Location of territory relative to zones of fire risk
D5.3	Risk to occupants and facilities from earthquake
D5.4	Population exposed to landslide risk
D5.5	Population exposed to flood risk
D5.6	Population exposed to industrial risk
D5.7	Territory exposed to environmental risks (fire, earthquake, landslide, flood, industrial risk etc)
D5.8	Population exposed to natural risks
E	**ECONOMY**
E1	**Local Economy**
E1.1	Use of local materials
E1.2	Companies with social/environmental certification
E1.3	Renovation and redevelopment of settlement for production activities abandoned
E1.4	Cover organic meals served in the canteen
E1.5	Budget of RES enterprises
E1.6	Employment in Energy improvement of the building stock
E1.7	Employment in RES enterprises
E1.8	Development of local label
E1.9	Local currencies for local economic systems
E1.10	Local added value
E1.11	Labour migration
E1.12	Train business to sustainable development
E1.13	Green Public Procurement
E1.14	Local forest wood supply chain
E1.15	Promotion of the building sector
E1.16	Voluntary Carbon Market by forest management
E2	**Actions for Innovation**
E2.1	Gross enrollment in the Company Register
E2.2	Training of handscrafts, SMEs incubators
E2.3	Research and Development
E2.4	Financial fund for energy saving in SMEs
E2.5	Involvement of citizens and SMEs to the local life, through local networks, partnerships, etc.

E3	Tourism
E3.1	Tourism rate
E3.2	Tourist accommodation capacity
E3.3	Floating population
E3.4	Tourist attractions
E3.5	Bed occupancy rate
E3.6	Summer tourism
E3.7	Touristic cycling pathways
E3.8	Seasonal staff accomodation
E3.9	Ski lifts
E3.10	Agritourism farmhouses
E3.11	Mountain huts
E3.12	Touristic flux
E3.13	Average stay of tourists
E3.14	Touristic pressure
E3.15	Presence of paths used for tourism
E3.16	Sustainable year round eco-tourism
E4	**Agriculture**
E4.1	Relevance of intensive agriculture
E4.2	Organic farming
E4.3	Economic relevance of agriculture
E4.4	Agricultural population
E4.5	Circular economy and short food systems
E4.6	Agricultural autonomy potential
E4.7	Field (arable) share of agriculture area
E4.8	Agricultural products of quality
E4.9	Food selfsufficiency
E4.10	Genetic diversity in agriculture
E4.11	Biologically cultivated area
E4.12	Use of pesticides
E4.13	Use of fertilizers
E5	**Industry**
E5.1	Area for industry
E5.2	Industrial Local Units
E5.3	Efficient use of the industrial areas
E5.4	Economic relevance of industry
E5.5	Resource productivity
E6	**Trade commerce**
E6.1	Import/export of food products and bevarages
E6.2	Settlements without grocery stores

6.1 A – TERRITORIES AND ENVIRONMENT

A1	Land	
A.1.1	**Vulnerability of the landscape-environ. system due to the fragmentation produced by linear infrastructure**	
	Intent:	To reduce the vulnerability of the landscape-environmental system due to the fragmentation produced by linear infrastructure
	Indicator:	Fragmentation caused by roads
	Unit of measure:	km/kmq
	Information sources:	Calculated data
	Assessment method:	Option 1: Calculate the ratio between the extraurban area (natural and agricultural) and the length of roads (and other linear infrastructures) in that area Option 2: Calculate the ratio between the extraurban area (natural and agricultural) and the length of roads without the tunnel sections and viaduct (and other linear infrastructures) in that area
	Territorial Scale:	All
	Standards or references:	Environmental Report of Territorial Regional Plan of Lombardy
A.1.2	**Forest Area**	
	Intent:	To assess the extension of forested areas
	Indicator:	Forested areas
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the ratio between forested areas and the geographical area considered
	Territorial Scale:	All
	Standards or references:	Lombardy Region, database of land use (DUSAF)
A.1.3	**Soil erosion by water**	
	Intent:	To reduce soil erosion by water
	Indicator:	Soil loss rate by water
	Unit of measure:	tons/ha/year
	Information sources:	Calculated data
	Assessment method:	Use models and simulation
	Territorial Scale:	All
	Standards or references:	JRC, http://esdac.jrc.ec.europa.eu/content/soil-erosion-water-rusle2015

A.1.4	**Quarries**	
	Intent:	To valorise and protect natural heritage and landscape
	Indicator:	Quarry area, for active and abandoned quarries
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the ratio between quarries areas and the geographical area considered
	Territorial Scale:	All
	Standards or references:	Geoportal, Quarries register of Lombardy
A.1.5	**Ability to lower atmospheric greenhouse gas concentrations through bio-sequestration**	
	Intent:	To offset increases in atmospheric carbon dioxide by storage of carbon in terrestrial carbon pools
	Indicator:	Carbon standing stock at a single point in time as a measure of watershed condition
	Unit of measure:	megagrams (Mg) of carbon (CO_2-eq) per hectare
	Information sources:	Calculated data
	Assessment method:	Calculate carbon stock evaluation as megagrams (Mg) of carbon (CO2-eq) per hectare. Carbon stock evaluation amalgamates remote sensing-based landscape classifications with vegetation plot data that includes above-ground biomass, litter accumulation on the soil floor, and below-ground carbon to estimate total carbon storage across the landscape
	Territorial Scale:	All
	Standards or references:	Study on the carbon stock and sequestration of Sacramento River region by UC Davis: https://indicators.ucdavis.edu/waf/model/indicator/carbon-stock-and-sequestration Information Center for the Environment at UC Davis, USA
A.1.6	**Carbon storage in forest**	
	Intent:	To adopt mitigation and adaptation measures to climate change
	Indicator:	Carbon storage in forest
	Unit of measure:	ton of CO2 equivalents
	Information sources:	Models and simulation data
	Assessment method:	Evaluation of CO2 storage in forest using the historical series derived from the National Inventory of Emissions, which is carried out each five years form ISPRA and regularly updated to ensure comparability of data
	Territorial Scale:	All
	Standards or references:	https://isprambiente.gov.it/it https://systemapiemonte.it/cms/privati/ambientye-e-energia/servizi/474-irea-inventario-regionale-delle-emissioni-in-atmosfera

A.1.7	Carbon Storage in soil	
	Intent:	To adopt mitigation and adaptation measures to climate change
	Indicator:	Carbon Storage in soil
	Unit of measure:	ton/ha
	Information sources:	Models and simulation data. The available data regarding the soils of the Piedmont Region are resident in the Pedological Information System
	Assessment method:	IPLA (Wood and Environment Italian Institute) uses a comprehensive regional information base for carbon stocks in soil and forests, built with data from the Regional Forest Inventory and the Piedmont Soil Sheet on scale 1: 250,000, both made on behalf of the Piedmont Region. Regarding carbon dioxide absorption and carbon dioxide monitoring and control, IPLA has been managing a CO2 monitoring station based on Eddy Covariance's techniques since 2002 on behalf of the Piedmont Region
	Territorial Scale:	All
	Standards or references:	IPLA (Wood and Environment Italian Institute): https://ipla.org/ . Regarding carbon dioxide absorption and carbon dioxide monitoring and control: international network (project Carboeurope) and national (Carboitaly project)

A2	Water Quality	
A.2.1	Environmental State of Watercourses	
	Intent:	To assess the quality of the surface water resources
	Indicator:	Relationship between the data relating to the Ecological State and data relating to the presence of chemical pollutants
	Unit of measure:	Index
	Information sources:	Qualitative data
	Assessment method:	Evaluate the Ecological State of water crossing the Ecological State and the Chemical State
	Territorial Scale:	Small - Large
	Standards or references:	Territorial Monitoring Plan of Piedmont Region, Italian D.lgs 3 april 2006, n. 152 "Environmental Regulation"

A.2.2	Surface water bodies (rivers and lakes): ecological status	
	Intent:	To improve water quality
	Indicator:	Evaluation of the ecological status of surface water body
	Unit of measure:	Index
	Information sources:	Calculated data
	Assessment method:	Data analysis process: verification of the ecological status by the integrated assessment indices for rivers and lakes determined on the basis of the evaluation of the worse data in three year for operative monitoring and in one year for Supervisory monitoring and the verification of the Environmental Quality Standards (EQS) for specific pollutants. The confirmation of the High Quality State is provided by hydromorphological parameters
	Territorial Scale:	All
	Standards or references:	State of Environment Report and Environmental Indicators - ARPA Piemonte. http://relazione.ambiente.piemonte.gov.it/2016/it; European Directive 2000/60/CE (WFD), Directive 2008/105/CE, Directive 2009/90/CE, Italian Legislative Decree 152/06, Decree 131/2008, Decree 17 July 2009,Italian Legislative Decree 219/10, Decree 260/10. Indices for rivers: ICMi (Intercalibration Common Metric Index), IBMR (Macrophyte Biological Index for Rivers), ISECI, (Fish Community Ecological Status), LIMeco (Pollution level by Macroindicators of the ecological status: oxygen, ammoniacal nitrogen, nitrate nitrogen, total phosphorus), STAR_ICMi (Standardisation of River Classification _ intercalibration Multimetric Index). Indices for lakes: ICF (Phytoplancton total index), LFI (Lake Fish Index), MTIspecies (Macrophytes Trophic Index species) /MacroIMMI (Macrophytes Italian MultiMetrics Index), LTLeco (TSI - Trophic State Index: trophic level by Total phosphorus, transparency and dissolved oxygen)Indices for rivers: ICMi (Intercalibration Common Metric Index), IBMR (Macrophyte Biological Index for Rivers), ISECI, (Fish Community Ecological Status), LIMeco (Pollution level by Macroindicators of the ecological status: oxygen, ammoniacal nitrogen, nitrate nitrogen, total phosphorus), STAR_ICMi (Standardisation of River Classification _ intercalibration Multimetric Index). Indices for lakes: ICF (Phytoplancton total index), LFI (Lake Fish Index), MTIspecies (Macrophytes Trophic Index species) /MacroIMMI (Macrophytes Italian MultiMetrics Index), LTLeco (TSI - Trophic State Index: trophic level by Total phosphorus, transparency and dissolved oxygen)

A.2.3	**Surface water bodies (rivers and lakes): chemical status**	
	Intent:	To improve water quality
	Indicator:	Evaluation of the chemical status of surface water body
	Unit of measure:	Index
	Information sources:	Calculated data
	Assessment method:	The Chemical Status Assessment has been defined at European level on the basis of a list of 33 + 8 hazardous or priority hazardous substances for which European Environmental Quality Standards (SQAs). The Chemical State may be Good / Not Good
	Territorial Scale:	All
	Standards or references:	State of Environment Report and Environmental Indicators - ARPA Piemonte. http://relazione.ambiente.piemonte.gov.it/2016/it European Directive 2000/60/CE (WFD), Directive 2008/105/CE, Directive 2009/90/CE, Italian Legislative Decree 152/06, Decree 131/2008, Decree 17 July 2009, Italian Legislative Decree 219/10, Decree 260/10, Directive 2008/105 / EC incorporated by Italian Dlgs 219 / 10.
A.2.4	**Groundwater: punctual chemical status**	
	Intent:	To improve water quality
	Indicator:	Evaluation of the punctual chemical quality of groundwater as a groundwater body (GWB)
	Unit of measure:	Index
	Information sources:	Monitored data
	Assessment method:	Index assess the chemical quality of groundwater at the single point of monitoring. The Chemical Status is determined on the basis of Environmental Quality Standards (SQAs) for pesticides and nitrates defined at European level
	Territorial Scale:	All
	Standards or references:	The Chemical Status is determined on the basis of Environmental Quality Standards (SQAs) for pesticides and nitrates defined at Community level by Directive 2006/118 / EC as transposed by DLgs 30/09 and national threshold values for other categories of contaminants. ARPA Piemonte: http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/acqua_sotterranee-stato-chimico-puntuale European Directive 2000/60/CE (WFD), Directive 2008/105/CE, Directive 2009/90/CE, Italian Legislative Decree 152/06, Decree 131/2008, Decree 17 July 2009,Italian Legislative Decree 219/10, Decree 260/10.

A.2.5	**Groundwater: GWB chemical status**	
	Intent:	To improve water quality
	Indicator:	Evaluation of the chemical quality of groundwater as a groundwater body (GWB)
	Unit of measure:	Index
	Information sources:	Monitored data
	Assessment method:	Monitoring ARPA Piemonte on groundwater bodies; The Chemical Status is not good when the percentage of area under the monitoring points was not good detailed chemical exceeds 20% of the total area of the GWB
	Territorial Scale:	All
	Standards or references:	ARPA Piemonte http://www.arpa.piemonte.gov.it/reporting/core-set-of-indicators/water/status-of-groundwater European Directive 2000/60/CE (WFD), Directive 2008/105/CE, Directive 2009/90/CE, Italian Legislative Decree 152/06, Decree 131/2008, Decree 17 July 2009, talian Legislative Decree 219/10, Decree 260/10
A.2.6	**Surface water quality**	
	Intent:	To evaluate quality (biological, physico-chemical, hydromorphological) of watercourse that has good influence on life of different animal species
	Indicator:	Ecological quality of watercourse
	Unit of measure:	%
	Information sources:	Monitored data
	Assessment method:	Calculate the percentage of watercourses that meet the requirements for ecological good state
	Territorial Scale:	All
	Standards or references:	Slovenian Environmental Agency, National Water Quality monitoring

A.2.7	Water quality in rivers	
	Intent:	To assess the quality of water resource evaluating the biochemical oxygen demand in rivers
	Indicator:	The mean annual five-day biochemical oxygen demand in rivers, as an average of all data from available measuring stations
	Unit of measure:	milligrams of O2 per litre
	Information sources:	Measured data
	Assessment method:	Measure the amount of oxygen required by aerobic microorganisms to decompose organic matter in a water sample over a period of five days in the dark at 20 °C and is expressed as mg O2/L
	Territorial Scale:	All
	Standards or references:	UN global list of SDG indicators, EUROSTAT http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&pcode=tsdnr330&language=en, EEA

A3	NATURE AND BIODIVERSITY	
A.3.1	Woodland	
	Intent:	To improve sustainable forestry
	Indicator:	Percentage of the territory covered by managed forest areas
	Unit of measure:	%
	Information sources:	Monitored data provided by Regional Institution
	Assessment method:	Verification of managed forest area (ha). Verification of total forest area (ha). Calculation of percentage f managed forest area as share of total forest area
	Territorial Scale:	All
	Standards or references:	Piedmont Region - Territorial Plans Forestry (PFT) http://www.systemapiemonte.it/cms/privati/territorio/servizi/526-systema-informativo-forestale-regionale

A.3.2	Areas of natural interest	
	Intent:	To improve biodiversity (concerning Sic, ZPS, national-regional-provincial protected areas)
	Indicator:	Percentage between natural areas and geographical area
	Unit of measure:	%
	Information sources:	Data banks provided by Regional Institution
	Assessment method:	Natural area calculation. Geographical area calculation. Percentage between natural area and geographical area
	Territorial Scale:	All
	Standards or references:	State of Environment Report and Environmental Indicators - ARPA Piemonte: http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/natura-e-biodiversita_aree-di-interesse-naturalistico
A.3.3	Any wetlands	
	Intent:	To improve biodiversity
	Indicator:	Density of protected wetlands/geographical area
	Unit of measure:	n/m2; ha/ha
	Information sources:	Data banks provided by Regional Institution
	Assessment method:	Option 1: Calculate the number of wetlands in the geographical area Option 2: Calculate the wetlands area (ha) in a territorial area (ha)
	Territorial Scale:	All
	Standards or references:	State of Environment Report and Environmental Indicators - ARPA Piemonte: http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/natura-e-biodiversita_stato-e-trend-delle-specie-ornitiche
A.3.4	Habitats in Natura 2000	
	Intent:	To assess protected habitats
	Indicator:	Protected habitats in Natura 2000
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculation of the ratio between protected habitats in Natura 2000 and the geographical area considered
	Territorial Scale:	All
	Standards or references:	Standard form of Natura 2000 sites

A.3.5	Amphibian species	
	Intent:	To protect and regenerate domestic amphibian species, and to maintain biodiversity
	Indicator:	Domestic amphibian species types
	Unit of measure:	Number
	Information sources:	Statistic data on native amphibian species
	Assessment method:	Verification of the number of native amphibian species types
	Territorial Scale:	Small
	Standards or references:	Department for the Environment, Government of Liechtenstein
A.3.6	**Fish species**	
	Intent:	To protect domestic fish species, and to maintain biodiversity
	Indicator:	Domestic fish species
	Unit of measure:	Number
	Information sources:	Statistic data on domestic fish species
	Assessment method:	Verification of the number of domestic fish species types
	Territorial Scale:	Small
	Standards or references:	Department for the Environment, Government of Liechtenstein
A.3.7	**Sustainable Forestry**	
	Intent:	To preserve the ecosystem
	Indicator:	Forest land certified
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the forest land certified over the total forest land
	Territorial Scale:	All
	Standards or references:	BMUB - Indikatorenbericht biologische Vielfalt 2014; PEFC, FSC and Naturland Certification, Nationwide Red Lists, Nature conservation associations
A.3.8	**Ecological network**	
	Intent:	To restore ecological connectivity between protected areas
	Indicator:	Area dedicated to ecological network
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the area dedicated to ecological network compared to the area of the municipality. Ecological network is composed by priority areas for biodiversity, all national and regional parks, Natura 2000 sites, corridors, ecological passages, ganglia
	Territorial Scale:	All
	Standards or references:	SIMON – Systema Informativo Monitoraggio PGT - Monitoring Informatic System for Territorial Governance Plans of Lombardy Municipalities, Natura 2000 sites, municipal plan

A.3.9	Endangered species	
	Intent:	To preserve the ecosystem
	Indicator:	Selected groups of species in the Red List Categories
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the percentage of species of selected groups of species in the Red List Categories
	Territorial Scale:	All
	Standards or references:	BMUB - Indikatorenbericht biologische Vielfalt 2014; Nationwide Red Lists, Nature conservation associations
A.3.10	**Fragmentation of natural and semi-natural areas**	
	Intent:	Evaluation of the fragmentation of natural/semi-natural lands, measuring the disintegration of the countryside (categories are forests, pasture, agricultural mosaics, semi-natural land, inland waters and wetlands)
	Indicator:	Spread of artificial and/or agricultural surfaces into previously 'core natural/semi-natural' landscapes
	Unit of measure:	%
	Information sources:	Measured data, GIS data
	Assessment method:	Calculate the quadratic mean between the mean values of the patch size of a given area between two dates
	Territorial Scale:	All
	Standards or references:	European Environment Agency Indicators, ISPRA database "Corine Land Cover 2000"
A.3.11	**Ecological diversity**	
	Intent:	To assess the structural consistency and vulnerability level, compared to the transformations induced by territorial landscape-planning processes, ensuring the richness of the types of landscape elements (habitats) that characterizes the environmental mosaic of each kind of landscape
	Indicator:	Real diversity (H) of each type of landscape / maximum theoretical Diversity (Hmax), calculated using the Shannon formula
	Unit of measure:	Adimensional Index
	Information sources:	Forest map and data on land use
	Assessment method:	Calculate the value of ecological diversity of each landscape (Shannon formula). Index, variable from 0 to 1
	Territorial Scale:	Large
	Standards or references:	Territorial Landscape Plan - Piedmont Region: http://www.regione.piemonte.it/territorio/pianifica/nuovo_ptr.htm

A.3.12	**Distribution of woodland plant species**	
	Intent:	To preserve the biodiversity
	Indicator:	Number of consistent species as a share of potential vegetation of a woodland area
	Unit of measure:	%
	Information sources:	Monitored data provided by Regional Institution
	Assessment method:	Index target value
	Territorial Scale:	All
	Standards or references:	SIFOR systema informativo forestale regionale http://www.systemapiemonte.it/popalfa/indaginiPFT/indexCategorieForestali.do
A.3.13	**Target species**	
	Intent:	To protect biodiversity
	Indicator:	Ecological and relevant types (anphibians, lepidoptera, …)
	Unit of measure:	Species number / territorial area * year
	Information sources:	Monitored data by Regional Institution
	Assessment method:	Calculate the number of species in the analysed area
	Territorial Scale:	All
	Standards or references:	Piedmont Region - Direttiva Habitat; EEA (European Environment Agency) Report - The IRENA indicator Report
A.3.14	**Common bird index**	
	Intent:	To evaluate the agricultural ecosystems under particular pressure
	Indicator:	The population status (abundance and diversity) of all common birds in the EU
	Unit of measure:	% (year 1990 = 100)
	Information sources:	Monitored data The source data used for this indicator are provided by the European Bird Census Council (EBCC) and its Pan-European Common Bird Monitoring Scheme (PECBMS) programme
	Assessment method:	Calculate the population abundance and the diversity of a selection of common bird species associated with specific habitats. Rare species are excluded. Three groups of bird species are represented: common farmland species, common forest species and all common bird species which include the farmland species, the forest species and a further common species (generalists, as opposed to the farmland and forest specialists)
	Territorial Scale:	All

	Standards or references:	European Commission, Eco-Innovation Observatory, UN global list of SDG indicators, EUROSTAT (online data code: tsdnr100) http://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tsdnr100

A4	**LANDSCAPE**	
A.4.1	**Panoramic roads and historical paths**	
	Intent:	To valorise and protect cultural and natural heritage
	Indicator:	Presence of panoramic roads and historical paths
	Unit of measure:	km; km/ha; km/geographical area
	Information sources:	Information data of Landscape Regional Plan
	Assessment method:	Option 1: Calculate the length of panoramic roads and historical paths Option 2: Calculate the ratio between the length of panoramic roads and historical paths on the territory Option 3: Calculate the ratio between the length of panoramic roads and historical paths on the geographical area
	Territorial Scale:	All
	Standards or references:	Geoportal of Lombardy Region
A.4.2	**Panoramic and scenic view points**	
	Intent:	To valorise and protect cultural and natural heritage
	Indicator:	Presence of panoramic and scenic view points
	Unit of measure:	number; number/ha; number/geographical area
	Information sources:	Information data of Landscape Regional Plan
	Assessment method:	Option 1: Calculate the number of panoramic and scenic view points Option 2: Calculate the ratio between the number of panoramic and scenic view points on the territory Option 3: Calculate the ratio between the number of panoramic and scenic view points on the geographical area
	Territorial Scale:	All
	Standards or references:	Geoportal of Lombardy Region
A.4.3	**Areas available for construction**	
	Intent:	Share of areas available for construction
	Indicator:	Areas available for construction on total territory
	Unit of measure:	%
	Information sources:	Statistical data
	Assessment method:	Calculate the area available for construction on total territory
	Territorial Scale:	Small
	Standards or references:	Slovenian Environmental Agency, CLC (CORINE Land Cover), Ministry of environment and spatial planning, Municipality data, MKO, Register of agricultural and forest land

A.4.4	**UNESCO Sites**	
	Intent:	To valorise and protect cultural and natural heritage
	Indicator:	Presence of Unesco sites
	Unit of measure:	Number
	Information sources:	Calculated data
	Assessment method:	Calculate the number of UNESCO sites on the territory
	Territorial Scale:	All
	Standards or references:	UNESCO, Geoportal of Lombardy Region, Landscape Regional Plan
A.4.5	**Geosites**	
	Intent:	To valorise and protect cultural and natural heritage
	Indicator:	Presence of geosites
	Unit of measure:	Number
	Information sources:	Calculated data
	Assessment method:	Calculate the number of geosites on the territory
	Territorial Scale:	All
	Standards or references:	Geoportal of Lombardy Region, Landscape Regional Plan
A.4.6	**Protected cultural heritage**	
	Intent:	To valorise and protect cultural and natural heritage
	Indicator:	Number of protected cultural goods
	Unit of measure:	Number
	Information sources:	Data banks
	Assessment method:	Calculate the number of all protected cultural goods on the territory
	Territorial Scale:	All
	Standards or references:	Geoportal of Lombardy Region, Ministry of cultural goods data banks

A.4.7	**Traditional agriculture elements**	
	Intent:	To preserve the rural areas' landscape
	Indicator:	Density of the natural and anthropogenic signs such as characteristic structures, terraces, rows, etc. of the agricultural mosaic in relation to the agricultural area
	Unit of measure:	number/ha; m/ha
	Information sources:	Data Bank (GIS) provided by Local and Regional Institutions
	Assessment method:	Option 1: Verification of the number (n) of rural elements. Verification of territorial area - UAA (useful agricultural area)-(ha). Calculation of the ratio between the number of elements and the territorial area (n/ha). Option 2: Verification of length in meter (m) of rural elements. Verification of territorial area - UAA (useful agricultural area)-(ha). Calculation of the ratio between meter (m) of rural elements and the territorial area- UAA (useful agricultural area)-(ha) (m/ha).
	Territorial Scale:	Small
	Standards or references:	IRES - Economic Research Institutes of Piedmont Region (E. Gottero - Un systema complesso da valutare: il paesaggio rurale. Indicatori a sostegno delle politiche. 2016) http://www.ires.piemonte.it/en/component/ducklibrary/?ultimepubblicazioni=20
A.4.8	**Index of landscape visibility**	
	Intent:	To preserve the landscape quality
	Indicator:	Density of routes and panoramic view point enjoyed by public
	Unit of measure:	n/ha; m/ha
	Information sources:	Data Bank (GIS) provided by Local and Regional Institutions
	Assessment method:	Option 1 Verification of the number (n) of panoramic view point. Verification of territorial area (ha). Calculation of the ratio between the number of panoramic view point and the territorial area (n/ha) Option 2 Verification of meter (m) of panoramic routes. Verification of territorial area (ha). Calculation of the ratio between meter (m) of panoramic routes and the territorial area (m/ha).
	Territorial Scale:	All
	Standards or references:	Charter of visual sensitivity at the regional level, from the viewpoint surveyed in the Regional Landscape Plan and a visual depth of 5 km. http://relazione.ambiente.piemonte.gov.it/2016/it/territorio/stato/paesaggio

A.4.9	Landscape perception variation	
	Intent:	Evaluate the impact of Regional Landscape Plan on different values that contribute to the complex evaluation
	Indicator:	Quality value of landscape perception
	Unit of measure:	Quality value
	Information sources:	Statistic data, Data banks
	Assessment method:	Derived data Quality value: Low, medium, high (prevalence of negative transformations, prevalence of unchanged situations, prevalence of positive transformations) Comparison between subsequent observations from 50 viewpoints evenly distributed on the regional territory
	Territorial Scale:	All
	Standards or references:	Territorial Landscape Plan - Piedmont Region: http://www.regione.piemonte.it/territorio/paesaggio/

A.4.10	Landscape heritage conservation status	
	Intent:	Calculate the integrity of the protection instruments value
	Indicator:	Quality value
	Unit of measure:	Quality value
	Information sources:	Statistic data, Data banks
	Assessment method:	Derivated data Quality value: Low, medium -low, medium, medium-high, high The evaluation is carried out by verifying the permanence of the values identified in the protection decree and the compromise factors that occurred after the date of the decree
	Territorial Scale:	All
	Standards or references:	Territorial Landscape Plan - Piedmont Region: http://www.regione.piemonte.it/territorio/paesaggio/ Ministerial Decrees and Declarations of outstanding public interest- MIBACT database

A5	WASTE		
A.5.1	Urban solid waste production (not separed)		
		Intent:	To reduce the waste production
		Indicator:	Annual total amount of waste
		Unit of measure:	Kg/inhabitant year; tons/year
		Information sources:	Calculated data
		Assessment method:	Option 1 Verification of total amount of waste(kg) (mixed municipal waste + separate collection of waste + other waste) in a year in a territory. Verification of the number of inhabitants living in the territory. Calculation of the ratio between total amount of waste in a year and the number of inhabitants Option 2 Verification of total amount of waste (ton) in a year in a territory (tons/year)
		Territorial Scale:	All
		Standards or references:	EUROSTAT, Regional Environment Protection Agency (ARPA Piemonte) -State of Environment Report and environmental indicators, Legal framework (ITA- EU): DLgs 152/06,DLgs 205/10 (implementation of the Directive 2008/98/EC)
A.5.2	Separate collection of waste		
		Intent:	To incentive the separate collection of waste
		Indicator:	Separate waste collection
		Unit of measure:	Kg/inhabitant year; %
		Information sources:	Statistic data
		Assessment method:	Option 1 Verification of total amount of separate waste collection (kg) in a year in a territory. Verification of the number of inhabitants living in the territory. Calculation of the ratio between total amount of separate waste collection in a year and the number of inhabitants (Kg/inhabitant year). Check the achievement of the separate waste collection objectives by legal framework. Option 2 Verification of total amount of separate waste collection (ton) in a year in a territory (tons/year).Verification of total amount of waste (ton) in a year in a territory. Calculation of the percentage of total amount of separate waste collection in a year in relationship to of total amount of waste (ton) in a year in a territory. Check the achievement of the separate waste collection objectives by legal framework
		Territorial Scale:	All
		Standards or references:	https://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/pressioni-ambientali/rifiuti_raccolta-differenziata

A.5.3	**Special waste management**	
	Intent:	To incentive waste recycle
	Indicator:	Total amount of special waste recycled or reused in a year (recovered waste, incinerated waste, special waste in landfill, special waste with other treatment) into the regional territory
	Unit of measure:	kTons/year
	Information sources:	Monitored data
	Assessment method:	Verification of total amount of recovered waste in a year. Verification of the total amount of incinerated waste in a year. Verification of the total amount of special waste in landfill in a year. Verification of the total amount of special waste with other treatment in a year. Calculation of the total amount of special waste
	Territorial Scale:	Large
	Standards or references:	https://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/pressioni-ambientali/rifiuti_gestione-rifiuti-speciali
A.5.4	**Production of special waste (not dangerous)**	
	Intent:	To minimize special waste production
	Indicator:	Amount of special waste per inhabitant, not dangerous (old appliances, from commercial activities, construction and demolition waste etc.) in a territory
	Unit of measure:	Ktons/year; tons/inhabitant year
	Information sources:	Monitored data
	Assessment method:	Option 1 Verification of total amount of special not dangerous waste in a year (Ktons/year) Option 2 Verification of total amount of special not dangerous waste in a year (ton). Verification of the number of inhabitants living in the territory. Calculation of the ratio between total amount of special not dangerous waste in a year and the number of inhabitants (ton/inhabitant year)
	Territorial Scale:	All
	Standards or references:	https://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/pressioni-ambientali/rifiuti_produzione-rifiuti-speciali-non-pericolosi

A.5.5	**Production of special waste (dangerous)**	
	Intent:	To minimize waste production
	Indicator:	Amount of special waste per inhabitant, dangerous (i.e. batteries)
	Unit of measure:	Ktons/year; tons/inhabitant year
	Information sources:	Monitored data
	Assessment method:	Option 1 Verification of total amount of special dangerous waste in a year (Ktons/year). Option 2 Verification of total amount of special dangerous waste in a year (ton). Verification of the number of inhabitants living in the territory. Calculation of the ratio between total amount of special dangerous waste in a year and the number of inhabitants (ton/inhabitant year).
	Territorial Scale:	All
	Standards or references:	https://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/pressioni-ambientali/rifiuti_produzione-rifiuti-speciali-pericolosi
A.5.6	**Recycling rate of municipal waste**	
	Intent:	To increase the separated collection of waste
	Indicator:	Recycling rate
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the recycling rate as the tonnage recycled from municipal waste divided by the total municipal waste arising
	Territorial Scale:	All
	Standards or references:	UN global list of SDG indicators, EUROSTAT, Data provided by municipalities
A.5.7	**Tourism impact on waste**	
	Intent:	Identify the contribution of the tourism sector to the production of municipal waste
	Indicator:	Tourism impact on waste
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the kg production of waste per inhabitant per year
	Territorial Scale:	All
	Standards or references:	United Nations Environment Programme (UNEP)

A6	EFFLUENTS	
A.6.1	Nitrogen concentration in groundwater	
	Intent:	To minimise nitrate content in groundwater
	Indicator:	Annual mean values of nitrate concentration at several selected sites or nitrate concentration in groundwater
	Unit of measure:	mg/l
	Information sources:	Calculated data
	Assessment method:	Measuring the annual maximum value of nitrate concentration at selected sites, then calculating the annual mean value overall based on these measurements
	Territorial Scale:	Small / All
	Standards or references:	Department for the Environment, Government of Liechtenstein, data provided by Arpa Piemonte
A.6.2	Phytosanitary vulnerability	
	Intent:	To minimise water pollution
	Indicator:	Phytosanitary concentration in surface aquifer and groundwater
	Unit of measure:	µg/L
	Information sources:	Monitored data
	Assessment method:	Monitoring procedure to verifying that the Phytosanitary concentration is below the value (Average annual value <1µg/L for each active substances; Average annual value for total phytosanitary <0,5 µg/L
	Territorial Scale:	All
	Standards or references:	Regional Environment Protection Agency (ARPA Piemonte): Report on the state of the environment https://www.arpa.piemonte.gov.it/reporting/rsa_2009/acqua2009-2 http://www.arpa.piemonte.gov.it/news/il-monitoraggio-della-qualita-delle-acque-come-strumento-di-supporto-alle-politiche-ambientali Directive 2006/118 / EC

A7	CONTAMINATED LAND	
A.7.1	Decontaminated sites	
	Intent:	To reduce the contamination of soil
	Indicator:	Decontaminated sites over the total contaminated area
	Unit of measure:	%
	Information sources:	Monitored data
	Assessment method:	Calculate the ratio between the surface of decontaminated sites and the total contaminated area
	Territorial Scale:	All
	Standards or references:	Geoportal of Lombardy Region
A.7.2	Density of contaminated sites	
	Intent:	To reduce the contamination of soil
	Indicator:	Number of contaminated sites with regards to the territory
	Unit of measure:	n/1.000 Km2; %
	Information sources:	Data Banks
	Assessment method:	Option 1: Verification of the number of contaminated sites. Calculation of the ratio between number of contaminated sites and the territorial area (n/1.000 Km2) Option 2: Verification of the total extension of contaminated sites. Calculation of the percentage of extension of contaminated sites in relationship to the territorial area (%)
	Territorial Scale:	Large
	Standards or references:	https://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/pressioni-ambientali/siti-contaminati_siti-rispetto-alla-popolazione-e-alla-superficie

A.7.3	Contaminated land with regards to inhabitants	
	Intent:	To reduce the contamination of soil
	Indicator:	Number of contaminated sites with regards inhabitants
	Unit of measure:	n/10.000 inhabitants; m2/inhabitants
	Information sources:	Data Banks
	Assessment method:	Option 1 Verification of the number of contaminated sites. Verification of the number of inhabitants living in the territory. Calculation of the ratio between number of contaminated sites and each 10.000 inhabitants. Option 2 Verification of the total extension of contaminated sites. Verification of the number of inhabitants living in the territory. Calculation of the ratio between the total extension of contaminated sites and the number of inhabitants living in the territory (n/inhabitant)
	Territorial Scale:	All
	Standards or references:	https://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/pressioni-ambientali/siti-contaminati_siti-rispetto-alla-popolazione-e-alla-superficie

A8	EMISSIONS	
A.8.1	Greenhouse gas emissions	
	Intent:	To reduce the emissions of greenhouse gases in total man-made emissions contributing to global warming
	Indicator:	Annual CO2-equivalent emissions (Co2, N2o, CH4, HFCs,PFCs,NF_3, SF_6)
	Unit of measure:	KTons/year
	Information sources:	Measured data
	Assessment method:	Calculate the KTons emissions of greenhouse gases in the year. The main indicator includes greenhouse gas (GHG) emissions from all sectors, including international aviation, but excludes emissions coming from international navigation and from land use, land-use change and forestry
	Territorial Scale:	All
	Standards or references:	UN global list of SDG indicators, EUROSTAT http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&pcode=t2020_30&language=en. The source data is provided by the European Environment Agency (EEA). It is based on the EU's annual GHG inventory reports to the United Nations Framework Convention on Climate Change (UNFCCC)

A.8.2	**GHG emission from energetic processes: mobility**	
	Intent:	To minimize the amount of CO2-equivalent emissions from all energy used for mobility
	Indicator:	Annual CO2-equivalent emissions (Co2, N2o, CH4)
	Unit of measure:	Tons/year
	Information sources:	Estimated data
	Assessment method:	Model and simulation to estimate the emissions of various pollutants at municipal, provincial and regional level for different types of activities. The classification used is the one adopted in the framework of inventories EMEP - CORINAIR
	Territorial Scale:	All
	Standards or references:	Piedmont Region-Regional inventory of emissions into the atmosphere: http://www.systemapiemonte.it/fedwinemar/elenco.jsp
A.8.3	**GHG emission from energetic processes: tertiary sector**	
	Intent:	To minimize the amount of CO2-equivalent emissions from all energy used in the tertiary sector
	Indicator:	Annual CO2-equivalent emissions (Co2, N2o, CH4)
	Unit of measure:	Tons/year
	Information sources:	Estimated data
	Assessment method:	Model and simulation to estimate the emissions of various pollutants at municipal, provincial and regional level for different types of activities. The classification used is the one adopted in the framework of inventories EMEP - CORINAIR
	Territorial Scale:	All
	Standards or references:	Piedmont Region-Regional inventory of emissions into the atmosphere: http://www.systemapiemonte.it/fedwinemar/elenco.jsp
A.8.4	**GHG emission from energetic processes: residential sector**	
	Intent:	To minimize the amount of CO2-equivalent emissions from all energy used in the residential sector
	Indicator:	Annual CO2-equivalent emissions (Co2, N2o, CH4)
	Unit of measure:	Tons/year
	Information sources:	Estimated data
	Assessment method:	Model and simulation to estimate the emissions of various pollutants at municipal, provincial and regional level for different types of activities. The classification used is the one adopted in the framework of inventories EMEP - CORINAIR
	Territorial Scale:	All
	Standards or references:	Piedmont Region-Regional inventory of emissions into the atmosphere: http://www.systemapiemonte.it/fedwinemar/elenco.jsp

A.8.5	GHG emission from energetic processes: industrial sector	
	Intent:	To minimize the amount of CO2-equivalent emissions from all energy used in the industrial sector
	Indicator:	Annual CO2-equivalent emissions (Co2, N2o, CH4)
	Unit of measure:	Tons/year
	Information sources:	Estimated data
	Assessment method:	Model and simulation to estimate the emissions of various pollutants at municipal, provincial and regional level for different types of activities. The classification used is the one adopted in the framework of inventories EMEP - CORINAIR
	Territorial Scale:	All
	Standards or references:	Piedmont Region-Regional inventory of emissions into the atmosphere: http://www.systemapiemonte.it/fedwinemar/elenco.jsp

A.8.6	GHG emission from energetic processes: agricultural sector	
	Intent:	To minimize the amount of CO2-equivalent emissions from all energy used in the agricultural sector
	Indicator:	Annual CO2-equivalent emissions (Co2, N2o, CH4)
	Unit of measure:	Tons/year
	Information sources:	Estimated data
	Assessment method:	Model and simulation to estimate the emissions of various pollutants at municipal, provincial and regional level for different types of activities. The classification used is the one adopted in the framework of inventories EMEP - CORINAIR
	Territorial Scale:	All
	Standards or references:	Piedmont Region-Regional inventory of emissions into the atmosphere: http://www.systemapiemonte.it/fedwinemar/elenco.jsp

A.8.7	Emissions of ozone-depleting substances during facility operations	
	Intent:	To minimize Ozone Depletion from leakage of CFC-11 equivalent
	Indicator:	CFC-11 equivalent, in gm per m2 per yr
	Unit of measure:	gm / m2 per yr
	Information sources:	Contract documents and equipment specifications
	Assessment method:	Evaluate the predicted emission of CFC-11 equivalent, based on the amount and type of refrigerants in the building, in gm per year
	Territorial Scale:	All
	Standards or references:	SBTool iiSBE International

A.8.8	Emissions of acidifying emissions during facility operations	
	Intent:	To minimize the production of atmospheric emissions from building operations that may result in acidification
	Indicator:	SO2 Equiv. per year in kg. per unit net area
	Unit of measure:	Kg. / m2 per yr
	Information sources:	Contract documents and equipment specifications, or EPD
	Assessment method:	Evaluate SO2 equivalent per year in kg. per unit net area
	Territorial Scale:	All
	Standards or references:	SBTool iiSBE International

A.8.9	Emissions leading to photo-oxidants during facility operations	
	Intent:	To minimize the production of atmospheric emissions from building operations that may result in photo-oxidants
	Indicator:	Ethene equivalent per year in gm per net unit area
	Unit of measure:	gm./m2 per yr
	Information sources:	Contract documents and equipment specifications, or EPD
	Assessment method:	Evaluate ethene equivalent per year in gm per net unit area
	Territorial Scale:	All
	Standards or references:	SBTool iiSBE International

A9	QUALITY OF AIR	
A.9.1	PM10 number of exceeded daily average	
	Intent:	Ensure that the annual average concentration of the particulate in the atmosphere (microscopic particles having a diameter less than 10 mm) is within the limit value for human health
	Indicator:	Counting of the daily limit of PM10 exceedances
	Unit of measure:	Number
	Information sources:	Monitoring plan
	Assessment method:	Evaluate the number of PM10 exceeded days
	Territorial Scale:	All
	Standards or references:	Territorial Monitoring Plan of Piedmont Region, Italian Ministerial Decree 2 April 2002, n. 60 about "air quality value limits"

A.9.2	Air quality - Concentration of PM2.5	
	Intent:	Respecting law limits of pollutant concentration - PM2.5
	Indicator:	Annual average concentration
	Unit of measure:	µg/m3
	Information sources:	Measured data
	Assessment method:	Consider annual average concentration statistic based on the data measured by the nearest detection unit to the territory (law limits for PM2.5: max 25 µg/m3 as annual average)
	Territorial Scale:	All
	Standards or references:	ARPA - Regional Agency for environment protection, INEMAR - INventario EMissioni Aria, Regional Environmental Agencies

A.9.3	Air quality - Concentration of O3	
	Intent:	Respecting law limits of pollutant concentration - O3
	Indicator:	Days of exceedances of law limits for O3 - target value for human health
	Unit of measure:	Number
	Information sources:	Measured data
	Assessment method:	Consider the number of days of exceedances of law limits for O3, statistic based on the data measured by the nearest detection unit to the territory (120 µg/m3 as 8 hours average, max 25 times for year)
	Territorial Scale:	All
	Standards or references:	ARPA - Regional Agency for environment protection, INEMAR - INventario EMissioni Aria, Regional Environmental Agencies

A.9.4	Air quality - Concentration of Benzo(a)pyren B(a)P	
	Intent:	Respecting law limits of pollutant concentration - B(a)P
	Indicator:	Annual average concentration B(a)P
	Unit of measure:	ng/m3
	Information sources:	Measured data
	Assessment method:	Calculate the annual average concentration of B(a)P, statistic based on the data measured by the nearest detection unit to the territory (law limits for B(a)P: max 1 ng/m3 as annual average)
	Territorial Scale:	All
	Standards or references:	ARPA - Regional Agency for environment protection, INEMAR - INventario EMissioni Aria, Regional Environmental Agencies

A.9.5	Asbestos roofing	
	Intent:	Reducing risks
	Indicator:	Surface of asbestos roofing
	Unit of measure:	m2; m2/km2
	Information sources:	Measured data
	Assessment method:	Option 1: Calculate the surface of asbestos roofing Option 2: Calculate the surface of asbestos roofing in the area
	Territorial Scale:	All
	Standards or references:	ARPA LOMBARDY- Regional Agency for environment protection, Regional Environmental Agencies

A.9.6	Asbestos concentration in the outdoor air	
	Intent:	To protect inhabitant's health
	Indicator:	Concentration of fibers in the air
	Unit of measure:	Number / liter
	Information sources:	Measured data
	Assessment method:	The indicator evaluates the presence of asbestos fibers in the collected air sample. The amount of aerodispersed fiber is measured by correlating the number of fibers to the volume of air sampled. The fibers are counted in the laboratory in electronic microscopy because it is the only technique capable of recognizing asbestos from other fibers and distinguishing the type of asbestos on the membrane
	Territorial Scale:	All
	Standards or references:	https://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/pressioni-ambientali/amianto_concentrazione-di-fibre-aerodisperse

A.9.7	Exposure to air pollution	
	Intent:	Evaluate the concentration of the particulate in the atmosphere
	Indicator:	Urban population exposure to air pollution by particulate matter
	Unit of measure:	µg/m3
	Information sources:	Calculated data
	Assessment method:	Calculate the concentration of PM10 and PM2.5
	Territorial Scale:	All
	Standards or references:	UN global list of SDG indicators, EUROSTAT http://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=tsdph370&language=en, the data is updated annually by the European Environment Agency (EEA) assisted by the Topic Centre on Air Pollution and Climate Change Mitigation (ETC/ACM)

A10	EXPOSURE TO NON IONISING RADIATION	
A.10.1	**Exposure to ELF Electromagnetic emissions**	
	Intent:	To minimize the exposition of inhabitants to ELF magnetic fields
	Indicator:	Extension of high voltage electric lines
	Unit of measure:	Km/Km2
	Information sources:	Statistic data
	Assessment method:	Verification of high voltage electric lines length (km). Verification of area (km2). Calculation of the ratio between length (km) and area (km2)
	Territorial Scale:	Large
	Standards or references:	https://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/pressioni-ambientali/radiazioni-non-ionizzanti_estensione-linee-elettriche
A.10.2	**Exposure to RF-MV Electromagnetic emissions**	
	Intent:	To minimize the exposition of inhabitants to high frequency electromagnetic fields
	Indicator:	Density of telecommunications installations
	Unit of measure:	number/Km2
	Information sources:	Statistic data
	Assessment method:	Verification of telecommunications installations number (n). Verification of area (km2). Calculation of the ratio between number (n) and area (km2)
	Territorial Scale:	Large
	Standards or references:	https://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/pressioni-ambientali/radiazioni-non-ionizzanti_densita-impianti-telecomunicazione

A11	EXPOSURE TO IONISING RADIATION	
A.11.1	**Indoor exposure to Radon**	
	Intent:	To reduce the exposition to ionising radiation
	Indicator:	Radon (Rn-222) concentration in the indoor air
	Unit of measure:	Becquerel / m3
	Information sources:	Monitoring data
	Assessment method:	Monitoring network
	Territorial Scale:	All
	Standards or references:	State of Environment Report and Environmental Indicators - ARPA Piemonte monitoring data
A.11.2	**Cesium 137 concentration**	
	Intent:	To reduce the exposition to ionising radiation
	Indicator:	Concentration of Cesium 137 in the environment
	Unit of measure:	Becquerel / m2 (Bq/m2)
	Information sources:	Measured data
	Assessment method:	Ratio between a Cesium concentration (Bq) in a square metre (m2) of soil
	Territorial Scale:	Small
	Standards or references:	https://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/pressioni-ambientali/radiazioni-ionizzanti_-reti-monitoraggio-concentrazione-attivita-cesio137-in-matrici-ambientali

A12	EXPOSURE TO NOISE	
A.12.1	**Exposure to traffic noise**	
	Intent:	To assess the share of population exposed to the excess noise
	Indicator:	Exposure to traffic noise
	Unit of measure:	Number; %
	Information sources:	Calculated data
	Assessment method:	Option 1: Calculate the number of people exposed to excess noise Option 2: Number of people exposed to excess noise to the total population
	Territorial Scale:	Large
	Standards or references:	Slovenian Environment Agency, Environmental indicators in Slovenia (PR18), EU Directive 2002/49/ES, EU Directive 2002/49/ES
A.12.2	**Exposure to and annoyance by traffic noise**	
	Intent:	Highlight numbers of people remain exposed to high levels of noise from rail and aircraft
	Indicator:	Share of population exposed to different traffic noise levels
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Estimate the percentage of population exposed to different road traffic noise levels
	Territorial Scale:	All
	Standards or references:	EEA – European Environment Agency http://www.eea.europa.eu/data-and-maps/indicators/traffic-noise-exposure-and-annoyance#toc-1

A13	INDUSTRIAL RISKS	
A.13.1	High risk plants and factories	
	Intent:	To reduce dangerous substances into the environment
	Indicator:	Number of high risk plants and factories/geographical area
	Unit of measure:	number/ area (km2 or ha)
	Information sources:	Measured data
	Assessment method:	Verification of the number of high risk plants and factories. Verification of territorial area. Calculation of the ratio between the number of high risk plants and factories and the territorial area
	Territorial Scale:	Large
	Standards or references:	https://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/uso-delle-risorse/industria_stabilimenti-a-rischio-di-incidente-rilevante-rir
A.13.2	Monitoring of High risk plants and factories	
	Intent:	To reduce dangerous substances into the environment
	Indicator:	Number of controls of high risk plants and factories/geographical area
	Unit of measure:	number/ area (m2 or ha)
	Information sources:	Measured data
	Assessment method:	Verification of the number of controls of high risk plants and factories. Verification of geographical area. Calculation of the ratio between the number of controls of high risk plants and factories and the geographical area
	Territorial Scale:	All
	Standards or references:	https://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/uso-delle-risorse/industria_controlli-negli-stabilimenti-rir

6.2 B- ENERGY/RESOURCES CONSUMPTION

B1	ENERGY CONSUMPTIONS	
B.1.1	**Final Energy Consumes**	
	Intent:	To reduce final energy consumptions
	Indicator:	Energy consumed / energy intensity
	Unit of measure:	Ktep; kTEP/Km2; KTEP/inhabitant; kJ/$
	Information sources:	Consumption data provided by the distribution system operators or official statistics; gross product is provide by national statistical offices; the territorial surface and the number of inhabitants comes from the competent public authorities
	Assessment method:	Option 1: a conversion is necessary for the various energy sources; Option 2: After the conversion, you can divide the value by the total area; Option 3: After the conversion, you can divide the value by the number of inhabitants; Option 4: After the conversion, you can divide the value by the Gross product, to estimate the energy intensity
	Territorial Scale:	All (difficult to estimate in small scale)
	Standards or references:	Unioncamere (Chambers of Commerce Union), OECD, IEA, EUROSTAT, Energy Statistics Manual, 2005
B.1.2	**Final Energy consumptions: tertiary sector**	
	Intent:	To reduce final energy consumptions in the tertiary sector
	Indicator:	Energy consumed in the tertiary sector
	Unit of measure:	ktep / employed
	Information sources:	Consumption data provided by the distribution system operators or official statistics; employed in the sector from Unioncamere
	Assessment method:	ktep consumed in tertiary sector / employed in tertiary sector; Calculation of the ratio
	Territorial Scale:	All (difficult to estimate in small scale)
	Standards or references:	Unioncamere (Chambers of Commerce Union),OECD, IEA, EUROSTAT, Energy Statistics Manual, 2005

B.1.3	Final Energy consumption: residential sector	
	Intent:	To reduce final energy consumptions in the residential sector
	Indicator:	Energy consumed in the residential sector
	Unit of measure:	ktep/mq ; ktep/inhabitant
	Information sources:	Consumption data provided by the distribution system operators or official statistics; the surface of housing and the number of inhabitants comes from the competent public authorities
	Assessment method:	Option 1: Verification of the final energy consumption by residential sector (ktep). Verification of the houses residential surface in the territory (mq). Calculation of the ratio between the final residential consumption and residential surface. Option 2: Verification of the final energy consumption by residential sector (ktep). Verification of the number of inhabitants living in the territory (n°). Calculation of the ratio between the final residential consumption and inhabitants.
	Territorial Scale:	All
	Standards or references:	OECD, IEA, EUROSTAT, Energy Statistics Manual, 2005
B.1.4	Final Energy consumptions: industrial sector	
	Intent:	To reduce final energy consumptions in the industrial sector
	Indicator:	Energy consumed in the industrial sector
	Unit of measure:	ktep / employed
	Information sources:	Consumption data provided by the distribution system operators or official statistics; employed in the sector from Unioncamere
	Assessment method:	Calculation of the ratio ktep consumed in industrial sector / employed in industrial sector
	Territorial Scale:	All (difficult to estimate in small scale)
	Standards or references:	Unioncamere - Chambers of Commerce Union), OECD, IEA, EUROSTAT, Energy Statistics Manual, 2005
B.1.5	Final Energy consumptions: agricultural sector	
	Intent:	To reduce final energy consumptions in the agricultural sector
	Indicator:	Energy consumed in the agricultural sector
	Unit of measure:	ktep / employed
	Information sources:	Consumption data provided by the distribution system operators or official statistics; employed in the sector from Regional Statistical Office
	Assessment method:	Calculation of the ratio ktep consumed in agricultural sector / employed in agricultural sector
	Territorial Scale:	All (difficult to estimate in small scale)
	Standards or references:	OECD, IEA, EUROSTAT, Energy Statistics Manual, 2005

B.1.6	**Final Energy consumptions: mobility**	
	Intent:	To reduce final energy consumptions for mobility
	Indicator:	Energy consumed for mobility
	Unit of measure:	ktep / inhabitant
	Information sources:	Consumption data provided by the distribution system operators or official statistics; and the number of inhabitants comes from the competent public authorities
	Assessment method:	Calculation of the ratio ktep (a conversion is necessary for the various fuels) consumed in transport sector (only private mobility, it's difficult to calculate the contribution of public transport) / inhabitants (it is also necessary to calculate the equivalent inhabitants, as in the case of tourists)
	Territorial Scale:	All (difficult to estimate in small scale)
	Standards or references:	OECD, IEA, EUROSTAT, Energy Statistics Manual, 2005
B.1.7	**Energy consumption of public buildings**	
	Intent:	To reduce energy consumption
	Indicator:	Energy consumption of public buildings over the total consumption in the territory
	Unit of measure:	%
	Information sources:	Statistic data
	Assessment method:	Calculate the energy consumption of public buildings over the total consumption in the territory
	Territorial Scale:	All
	Standards or references:	Technical standard, Database of the national electricity grid, municipality guidelines
B.1.8	**Petroleum products sold**	
	Intent:	Energy Saving and CO2 emissions reduction
	Indicator:	Quantity of petroleum products sold
	Unit of measure:	Tons/year
	Information sources:	Statistic data by National Ministry
	Assessment method:	Verification of final petroleum products sold in a year
	Territorial Scale:	All
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/uso-delle-risorse/energia_vendita-di-prodotti-petroliferi

B.1.9	**Electric Energy consumptions: tertiary sector**	
	Intent:	To reduce energy consumption
	Indicator:	Average energy consumption per capita per year in tertiary sector
	Unit of measure:	MWh / employed in tertiary sector
	Information sources:	Data provided by the Manager of the national electricity grid, and Unioncamere for employed in tertiary sector; in the touristic areas you may need to take account of population equivalent
	Assessment method:	Calculation of energy consumption per capita per year in tertiary sector
	Territorial Scale:	All
	Standards or references:	Unioncamere (Chambers of Commerce Union), OECD, IEA, EUROSTAT, Energy Statistics Manual, 2005
B.1.10	**Electric Energy consumption: residential sector**	
	Intent:	To reduce energy consumption
	Indicator:	Average energy consumption per capita per year
	Unit of measure:	MWh / inhabitants
	Information sources:	Data provided by the Manager of the national electricity grid, municipality or other public administration for number of inhabitants; in the touristic areas you may need to take account of population equivalent
	Assessment method:	Calculation of the average energy consumption per capita per year
	Territorial Scale:	All
	Standards or references:	OECD, IEA, EUROSTAT, Energy Statistics Manual, 2005
B.1.11	**Electric Energy consumptions: industrial sector**	
	Intent:	To reduce energy consumption
	Indicator:	Average energy consumption per capita per year in industrial sector
	Unit of measure:	MWh / employed in industrial sector
	Information sources:	Data provided by the Manager of the national electricity grid, and Unioncamere for employed in industrial sector
	Assessment method:	Calculation of the average energy consumption per capita per year in industrial sector
	Territorial Scale:	All
	Standards or references:	Unioncamere (Chambers of Commerce Union), OECD, IEA, EUROSTAT, Energy Statistics Manual, 2005

B.1.12	**Electric Energy consumptions: agricultural sector**	
	Intent:	To reduce energy consumption
	Indicator:	Average energy consumption per capita per year in agricultural sector
	Unit of measure:	MWh / employed in agricultural sector
	Information sources:	Data provided by the Manager of the national electricity grid, and Regional Statistical Office for employed in agricultural sector
	Assessment method:	Calculate the average energy consumption per capita per year in agricultural sector
	Territorial Scale:	All (difficult to estimate in small scale)
	Standards or references:	Unioncamere (Chambers of Commerce Union), OECD, IEA, EUROSTAT, Energy Statistics Manual, 2005
B.1.13	**Electric Energy consumptions: mobility sector**	
	Intent:	To reduce energy consumption
	Indicator:	Energy consumption per charging points per year
	Unit of measure:	MWh / charging points
	Information sources:	Monitored data provided by the Regional platform for electric mobility
	Assessment method:	Ratio between energy consumption (MWh) and number of charging points
	Territorial Scale:	All
	Standards or references:	Regional Electric Mobility Platform: http://www.regione.piemonte.it/trasporti/mobilitaElettrica.htm
B.1.14	**Electric Energy consumptions in urban areas**	
	Intent:	To reduce energy consumption
	Indicator:	Energy consumption per capita per year
	Unit of measure:	Kwh /person year
	Information sources:	Statistic data provided by the Manager of the national electricity grid, municipality
	Assessment method:	Use of statistic data
	Territorial Scale:	Large
	Standards or references:	http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/uso-delle-risorse/energia_consumo-di-energia-elettrica
B.1.15	**Thermal energy consumption: private buildings**	
	Intent:	To reduce energy consumption
	Indicator:	Average thermal energy consumption per m2 in private buildings
	Unit of measure:	kWh / m2
	Information sources:	Data provided by the fuel distributors and local administration
	Assessment method:	Conversion of the calorific value of all fuels in kWh and division with the total square meters of residential surfaces
	Territorial Scale:	All
	Standards or references:	OECD, IEA, EUROSTAT, Energy Statistics Manual, 2005

B.1.16	**Thermal energy consumption: public buildings**	
	Intent:	To reduce energy consumption
	Indicator:	Average thermal energy consumption per m2 in public buildings
	Unit of measure:	kWh / m2
	Information sources:	Data provided by the fuel distributors and local administration
	Assessment method:	Conversion of the calorific value of all fuels in kWh and division with the total square meters of public buildings
	Territorial Scale:	All
	Standards or references:	OECD, IEA, EUROSTAT, Energy Statistics Manual, 2005
B.1.17	**Thermal energy consumption: industrial buildings**	
	Intent:	To reduce energy consumption
	Indicator:	Average thermal energy consumption per m2 in industrial buildings
	Unit of measure:	kWh / m2
	Information sources:	Data provided by the fuel distributors and local administration
	Assessment method:	Conversion of the calorific value of all fuels in kWh and division with the total square meters of industrial buildings
	Territorial Scale:	All
	Standards or references:	OECD, IEA, EUROSTAT, Energy Statistics Manual, 2005
B.1.18	**Winter sports energy consumption**	
	Intent:	To assess the impact of coping strategy of winter resorts
	Indicator:	Energy consumption of winter sports activities
	Unit of measure:	kWh/season
	Information sources:	Local authorities and managing companies
	Assessment method:	kWh of energy consumption for winter resorts activities (ski lift and artificial snow production)
	Territorial Scale:	Small
	Standards or references:	Regional energy and climate plan (SRCAE); local energy and climate plan (PCET)
B.1.19	**Degree of renewable energy consumed (% of total consumption)**	
	Intent:	To measure how extensive the use of renewable energy is
	Indicator:	Share of renewable energy in gross final energy consumption
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the ratio of renewable energy consumption to all energy consumption
	Territorial Scale:	All
	Standards or references:	UN global list of SDG indicators, EUROSTAT, Directive 2009/28/EC on the promotion of the use of energy from renewable sources, Statistic Institutes

B.1.20	Efficiency in energy use in existing residential buildings	
	Intent:	To promote an efficient energy use by the existing residential building stock
	Indicator:	Number of energy efficient buildings as a share of exiting residential building stock
	Unit of measure:	%
	Information sources:	Statistic data, Regional Data banks
	Assessment method:	Calculation of percentage of the numbers of energy efficient buildings in relationship with the exiting residential building stock
	Territorial Scale:	All
	Standards or references:	ISTAT (National Statistic Institute) for exiting residential building stock; Piedmont Region (energy efficiency classes to consider: A1, A2, A3, A4) for numbers of energy efficient buildings
B.1.21	Efficiency in energy use in existing non residential buildings	
	Intent:	To promote an efficient energy use by the existing non residential building stock
	Indicator:	Number of energy efficient buildings as a share of exiting not residential building stock
	Unit of measure:	%
	Information sources:	Statistic data, Regional Data banks
	Assessment method:	Calculation of percentage of the numbers of energy efficient buildings in relationship with exiting not residential building stock
	Territorial Scale:	All
	Standards or references:	ISTAT (National Statistic Institute) for exiting non residential building stock; Piedmont Region (energy efficiency classes to consider: A1, A2, A3, A4) for numbers of energy efficient buildings

B2	SUSTAINABLE ENERGY	
B.2.1	Renewable energy locally produced	
	Intent:	To assess the level of renewable energy production compared to the consumption and then the level of 'autonomy" of the territory.
	Indicator:	Option1: RES production (kWh/year) compared to global energy consumption (final kWh/year) Option2: Total RE produced as % of the total energy demand / self-sufficiency
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Collection of data established with official calculation method for RES production and energy consumption Option 1: - Collection of data established with official calculation method for RES production and energy consumption. - Calculation of the ratio between RES production (kWh/year) and global energy consumption (final kWh/year) Option 2: Calculation of the ratio between total RE produced AND total energy demand / self-sufficiency
	Territorial Scale:	Large
	Standards or references:	OREGES, SNDD, SOEs, CLER TEPOS (French network for the energy transition, Working group for positive energy territories), SEAP ALPS, French Regional observatory of energy consumption and GES emissions
B.2.2	Production Power by Wind	
	Intent:	To improve the share of renewable energy
	Indicator:	Total amount of power produced by wind
	Unit of measure:	MWh / km²; TEP/Km2; TEP/inhabitant
	Information sources:	Statistic data
	Assessment method:	Calculate the total amount of power produced by wind in the area
	Territorial Scale:	All
	Standards or references:	Database of the manager of the national electricity grid, municipality guidelines
B.2.3	Production Power by Water	
	Intent:	To improve the share of renewable energy
	Indicator:	Total amount of power produced by water
	Unit of measure:	MWh / km²; TEP/Km2; TEP/inhabitant
	Information sources:	Statistic data
	Assessment method:	Calculate the total amount of power produced by water in the area
	Territorial Scale:	All
	Standards or references:	Database of the manager of the national electricity grid, municipality guidelines

B.2.4	**Heat by Biomass**	
	Intent:	To improve the share of renewable energy
	Indicator:	Total amount of heat produced by biomass
	Unit of measure:	MWh / km²; TEP/Km2; TEP/inhabitant
	Information sources:	Statistic data
	Assessment method:	Calculate the total amount of power produced by biomass in the area
	Territorial Scale:	All
	Standards or references:	
B.2.5	**Heat by solar thermal sources**	
	Intent:	To improve the share of renewable energy
	Indicator:	Total amount of heat produced by sun
	Unit of measure:	MWh / km²
	Information sources:	Statistic data
	Assessment method:	Calculate the total amount of power produced by sun in the area
	Territorial Scale:	All
	Standards or references:	Database of the manager of the national heating grid, municipality guidelines
B.2.6	**Heat by geothermal sources**	
	Intent:	To improve the share of renewable energy
	Indicator:	Total amount of heat produced by geothermal sources
	Unit of measure:	MWh / km²
	Information sources:	Statistic data
	Assessment method:	Calculate the total amount of power produced by geothermal sources in the area
	Territorial Scale:	All
	Standards or references:	Database of the manager of the national heating grid, municipality guidelines
B.2.7	**Energetic balance of primary energy**	
	Intent:	To evaluate energy self-sufficiency
	Indicator:	Percentage of exported energy in relationship with imported energy
	Unit of measure:	%
	Information sources:	Statistic data provided by Manager of the national electricity grid
	Assessment method:	Use of statistic data
	Territorial Scale:	All
	Standards or references:	Piedmont Region - Energetic Regional Plan: http://www.regione.piemonte.it/energia/pianoEnergReg.htm ENEA (Italian national Agency for new technologies, energy and sustainable economic development)

B.2.8	**PV production**	
	Intent:	To assess the level of PV electricity production
	Indicator:	PV electricity production
	Unit of measure:	kWh/year
	Information sources:	Monitoring and statistic data
	Assessment method:	Calculate the PV production with a collection of data established with official calculation method and units
	Territorial Scale:	Large
	Standards or references:	OREGES, Indicateurs du DD pour les territoires SNDD, SOEs, SEAP ALPS
B.2.9	**Biogas production**	
	Intent:	To assess the level of biogas production
	Indicator:	Biogas production
	Unit of measure:	kWh/year
	Information sources:	Monitoring and statistic data
	Assessment method:	Calculate the biogas production with a collection of data established with official calculation method and units
	Territorial Scale:	Large
	Standards or references:	OREGES, Indicators SNDD, SOEs, SEAP ALPS
B.2.10	**Energy productivity**	
	Intent:	To promote efficient energy systems able to reduce the energy used to provide services and products
	Indicator:	Amount of economic output that is produced per unit of energy used
	Unit of measure:	€ / kg of oil equivalent
	Information sources:	Statistic data
	Assessment method:	The indicator results from the division of the gross domestic product (GDP) by the gross inland consumption of energy for a given calendar year. It measures the productivity of energy consumption For the calculation of energy productivity Eurostat uses the GDP either in the unit of EUR in chain-linked volumes to the reference year 2010 at 2010 exchange rates or in the unit PPS (Purchasing Power Standard). The unit EUR in chain linked volumes allows observing the energy productivity trends over time in a single geographic area, whereas the unit PPS allows to compare countries for the same year. The gross inland consumption of energy is calculated as the sum of the gross inland consumption of five energy types: coal, electricity, oil, natural gas and renewable energy sources. Since GDP is measured in million EUR or million PPS and gross inland consumption in thousand tonnes of oil equivalent, energy productivity is available in both EUR per kg of oil equivalent and PPS per kg of oil equivalent.
	Territorial Scale:	Large
	Standards or references:	UN global list of SDG indicators, EUROSTAT (online data code: t2020_rd310) http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&pcode=t2020_rd310&language=en

B3	WATER CONSUMPTION	
B.3.1	**Consumption of water – Human uses**	
	Intent:	To reduce water consumptions for human uses
	Indicator:	Annual water consumption per inhabitant
	Unit of measure:	m3/inhabitant year
	Information sources:	Statistic data
	Assessment method:	Use of statistic data Calculation of the ratio between water consumption (human use) (m3) and the number of inhabitants (m3/inhabitant year)
	Territorial Scale:	Large
	Standards or references:	https://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/componenti-ambientali/acqua_consumo-acqua-potabile ISTAT (National Institute for statistic)
B.3.2	**Consumption of water for Agriculture– Non human uses**	
	Intent:	To reduce water consumptions in Agriculture
	Indicator:	Annual water consumption per Km2 of agricultural areas
	Unit of measure:	m3/Km2
	Information sources:	Measured data
	Assessment method:	Calculate water consumed for the irrigation of areas intended for Agriculture purposes
	Territorial Scale:	All
	Standards or references:	ISTAT, https://www.istat.it/it/files/2014/11/Utilizzo_risorsa_idrica.pdf
B.3.3	**Winter sports water consumption**	
	Intent:	To assess the impact of coping strategy of winter resorts
	Indicator:	Water consumption of winter sports activities
	Unit of measure:	m3 /season
	Information sources:	Local authorities and managing companies
	Assessment method:	Calculate the total m3 of water consumed for the production of artificial snow
	Territorial Scale:	Small
	Standards or references:	Regional energy and climate plan (SRCAE); local energy and climate plan (PCET)

B4	LAND AND BUILDING STOCK USE	
B.4.1	**Efficiency in the use of existing residential building**	
	Intent:	To promote an efficient use of the existing residential building stock
	Indicator:	Ratio between the total estimated area of not occupied residential buildings and the total area of residential buildings in the territory
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the total estimated area of not occupied residential buildings and the total area of residential buildings in the territory
	Territorial Scale:	Small
	Standards or references:	IEA International Energy Agency
B.4.2	**Efficiency in the use of existing non residential building**	
	Intent:	To promote an efficient use of the existing non residential building stock
	Indicator:	Ratio between the total estimated area of not occupied non residential buildings and the total area of non **residential** buildings in the territory
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the total estimated area of not occupied non residential buildings and the total area of non residential buildings in the territory
	Territorial Scale:	Small
	Standards or references:	IEA International Energy Agency
B.4.3	**Land use**	
	Intent:	To reduce land consumption
	Indicator:	Urbanized area
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the total artificial area with its subunits of total built-up area and total artificial non-built-up area divided by the total area
	Territorial Scale:	All
	Standards or references:	EUROSTAT, ISPRA; Lucas; SIMON – Systema Informativo Monitoraggio PGT - Monitoring Informatic System for Territorial Governance Plans of Lombardy Municipalities, Data provided by municipalities - Corine Land Cover

B.4.4	**Consumption of soil resulting from sealing**	
	Intent:	To reduce land consumption
	Indicator:	Sealed area
	Unit of measure:	%
	Information sources:	Statistic data provided by municipalities
	Assessment method:	It considers the areas with sealed soil for an evaluation of compromission of ecological function of the soil: Sealed area / total area
	Territorial Scale:	All
	Standards or references:	Corine Land Cover; ISPRA (National Institute for Environmental Protection and Research – Italy): http://www.sinanet.isprambiente.it/it/sia-ispra/download-mais/consumo-di-suolo/dati-nazionali-regionali-provinciali-e-comunali Lucas; SIMON – Systema Informativo Monitoraggio PGT - Monitoring Informatic System for Territorial Governance Plans of Lombardy Municipalities (LOMBARDIA)
B.4.5	**Level of settlement**	
	Intent:	To measure the attractiveness as living location
	Indicator:	Average number of dwellings per km²
	Unit of measure:	∑ dwelling / km²
	Information sources:	Measured data
	Assessment method:	Option 1: Addition of all dwellings of the geographical area and calculate the sum Option 2: Divide through the number of km² the geographical area has
	Territorial Scale:	All
	Standards or references:	Bayerische Verwaltung für Ländliche Entwicklung - Vitalitäts-Check 2.0 zur Innenentwicklung für Dörfer und Gemeinden Leitfaden
B.4.6	**Intensity of land use**	
	Intent:	To reduce land consumption
	Indicator:	Intensity of land use
	Unit of measure:	m2/inhabitant
	Information sources:	Measured data
	Assessment method:	Calculate the urbanized area per capita, considering the ratio between the total municipal area and the total population
	Territorial Scale:	All
	Standards or references:	ISPRA; Lucas; SIMON – Systema Informativo Monitoraggio PGT - Monitoring Informatic System for Territorial Governance Plans of Lombardy Municipalities

B.4.7	**Vulnerability of agricultural soil**	
	Intent:	To reduce the impact on agricultural system
	Indicator:	Fertile soil consumption
	Unit of measure:	%
	Information sources:	Statistic data
	Assessment method:	Calculate the surface of fertile soil consumed over the total area. Assess how new urbanisations subtract soils useful to agricultural production, evaluated by land capability classification (I, II, III classes of land capability)
	Territorial Scale:	all
	Standards or references:	ERSA, Territorial Regional Plan, Piedmont Region - Monitoring soil Consumption: http://www.regione.piemonte.it/territorio/pianifica/sostenibilita.htm
B.4.8	**Urbanized area**	
	Intent:	To reduce land consumption
	Indicator:	Urbanized area
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the ratio between the areas already built (different from natural or agricultural soil) and total municipal area
	Territorial Scale:	All
	Standards or references:	ISPRA; Lucas; SIMON – Systema Informativo Monitoraggio PGT - Monitoring Informatic System for Territorial Governance Plans of Lombardy Municipalities
B.4.9	**Urbanisable area**	
	Intent:	To reduce land consumption
	Indicator:	Urbanisable area
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the sum of areas with new urbanization previsions foreseen in Municipal Urban Plan which are not already built and total municipal area
	Territorial Scale:	All
	Standards or references:	Regional law 31/2014, Territorial Regional Plan of Lombardy, SIMON – Systema Informativo Monitoraggio PGT - Monitoring Informatic System for Territorial Governance Plans of Lombardy Municipalities

B.4.10	**Sprawl**	
	Intent:	To reduce land consumption
	Indicator:	Urbanized dispersion index
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the following formula (SUD + SUR / SU) * 100 where: SUD = Discontinuous urbanized area (mq) SUR = Surface scattered urbanisation (mq) SU = total urbanized area (mq)
	Territorial Scale:	All
	Standards or references:	Lucas; Territorial Regional Plan, Piedmont Region - Monitoring soil Consumption: http://www.regione.piemonte.it/territorio/pianifica/sostenibilita.htm ISPRA (National Institute for Environmental Protection and Research – Italy): http://www.sinanet.isprambiente.it/it/sia-ispra/download-mais/consumo-di-suolo/dati-nazionali-regionali-provinciali-e-comunali
B.4.11	**Land consumption**	
	Intent:	To reduce land consumption
	Indicator:	Land consumption
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the ratio between the sum of Urbanized area and Urbanisable area over the total municipal area
	Territorial Scale:	All
	Standards or references:	Regional law 31/2014, Territorial Regional Plan of Lombardy, SIMON – Systema Informativo Monitoraggio PGT - Monitoring Informatic System for Territorial Governance Plans of Lombardy Municipalities
B.4.12	**Impact area of land use**	
	Intent:	To reduce land consumption
	Indicator:	Impact area of land use
	Unit of measure:	%
	Information sources:	Monitored and estimated data provided by Region / Municipalities
	Assessment method:	Calculate the impact of area already built (different from natural or agricultural soil) to assest the compromission of the territory. Verification of the urbanized area (ha) with a buffer. Verification of territorial area (ha). Calculation urbanized area as a share of total area.
	Territorial Scale:	All
	Standards or references:	Piedmont Region - Monitoring soil Consumption: http://www.regione.piemonte.it/territorio/pianifica/sostenibilita.htm

B.4.13	**Land consumption by infrastructures**	
	Intent:	To reduce land consumption
	Indicator:	Land consumption by infrastructures
	Unit of measure:	%
	Information sources:	Monitored and estimated data provided by Region / Municipalities
	Assessment method:	Calculate infrastructure area. Verification of territorial area (ha). Calculation land consumption by infrastructure area as a share of total area.
	Territorial Scale:	All
	Standards or references:	Piedmont Region - Monitoring soil Consumption: http://www.regione.piemonte.it/territorio/pianifica/sostenibilita.htm
B.4.14	**Index of reversible soil consumption**	
	Intent:	To reduce land consumption
	Indicator:	Reversible soil consumption
	Unit of measure:	%
	Information sources:	Monitored and estimated data provided by Region / Municipalities
	Assessment method:	Assess land consumption due to the reversible uses (quarries, urban parks, sports facilities, photovoltaic plants ...) within a given territory. Calculate the reversible soil consumption area (ha) . Verification of territorial area (ha). Calculation reversible soil consumption area as a share of total area
	Territorial Scale:	All
	Standards or references:	Piedmont Region - Monitoring soil Consumption: http://www.regione.piemonte.it/territorio/pianifica/sostenibilita.htm
B.4.15	**Index of total soil consumption**	
	Intent:	To reduce land consumption
	Indicator:	Total soil consumption
	Unit of measure:	%
	Information sources:	Monitored and estimated data provided by Region / Municipalities
	Assessment method:	Assess total land consumption (sum of urbanized area, infrastructural area, reversible soil consumption area). Calculate the urbanized area, the infrastructural area, the reversible soil consumption area. Sum the urbanized area, the infrastructural area, the reversible soil consumption area.(ha). Verification of territorial area (ha). Calculation total soil consumption area as a share of total area.
	Territorial Scale:	All
	Standards or references:	Piedmont Region - Monitoring soil Consumption: http://www.regione.piemonte.it/territorio/pianifica/sostenibilita.htm

B.4.16	Life cycle analysis	
	Intent:	To assess constructions and the life of materials
	Indicator:	Amount of reused material
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the amount of reused material
	Territorial Scale:	All
	Standards or references:	Data banks of life cycle analysis, IZU Bayern

6.3 C- INFRASTRUCTURES/SERVICES

C1	MOBILITY	
C.1.1	Access to public transportation	
	Intent:	To measure the development of public transportation
	Indicator:	Number of public transport stops in the territory
	Unit of measure:	Number; number per km2
	Information sources:	Calculated data
	Assessment method:	Option 1: Calculate the number of public transport stops Option 2: Calculate the density of public transport stops in the area
	Territorial Scale:	All
	Standards or references:	Maps of public transportation, Deutsche Gesellschaft Nachhaltiges Bauen - Nutzungsprofil Büro und Verwaltungsgebäude
C.1.2	Performance of the public transport	
	Intent:	To improve accessibility to public transportation
	Indicator:	Number of journeys per day
	Unit of measure:	Number of journeys/inhabitants
	Information sources:	Calculated data
	Assessment method:	Calculate the number of journeys per day (>10, >7, >3, 0) per inhabitants
	Territorial Scale:	All
	Standards or references:	Municipaliity maps of public transportation, Deutsche Gesellschaft Nachhaltiges Bauen - Nutzungsprofil Büro und Verwaltungsgebäude
C.1.3	Quality of walkways for pedestrian use	
	Intent:	To assess the extent and quality of walkways for occupants and users
	Indicator:	Type and extent of secured walkways in the project (walkways sheltered from rain, snow or excess sunshine, etc.)
	Unit of measure:	Number and Extension
	Information sources:	Measured data
	Assessment method:	Through a desk analysis evaluate the typology and extent of secured walkways
	Territorial Scale:	All
	Standards or references:	SBTool iiSBE International

C.1.4	**Car ownership**	
	Intent:	To reduce the number of cars
	Indicator:	Number of personal automobiles
	Unit of measure:	car/person
	Information sources:	Statistic data
	Assessment method:	Calculate the number of personal automobiles for inhabitants
	Territorial Scale:	All
	Standards or references:	Automobile Public Register, Public Car record Book of the municipalities
C.1.5	**Transport on demand service**	
	Intent:	To decrease the use of individual car
	Indicator:	Number of existing lines
	Unit of measure:	Number
	Information sources:	Calculated data
	Assessment method:	Calculate the sum of the existing lines
	Territorial Scale:	Small
	Standards or references:	Study from State agency CEREMA, local authorities responsible for transport organisation and non for profit organisation of the social sector organising transport on demand service
C.1.6	**Electricity dispensing systems**	
	Intent:	Increase services for inhabitants
	Indicator:	Electricity dispensing systems
	Unit of measure:	Number/km2
	Information sources:	Measured data
	Assessment method:	Calculate the number of electricity dispensing systems in the analysed area
	Territorial Scale:	All
	Standards or references:	Open Data Lombardia, Economic development General Direction
C.1.7	**Methane fuel dispensing systems**	
	Intent:	Increase services for inhabitants
	Indicator:	Methane fuel dispensing systems
	Unit of measure:	Number; number/inhabitants; number/km2
	Information sources:	Open Data Lombardia
	Assessment method:	Option 1: Calculate the number of methane fuel dispensing systems for vehicles for public use Option 2: Calculate the number of methane fuel dispensing systems for vehicles per inhabitants Option 3: Calculate the number of methane fuel dispensing systems for vehicles per area
	Territorial Scale:	All
	Standards or references:	Open Data Lombardia, Economic development General Direction

C.1.8	**Number of dispensing systems**	
	Intent:	Increase services for inhabitants
	Indicator:	Fuel dispensing systems
	Unit of measure:	Number; number/inhabitants; number/km2
	Information sources:	Open Data Lombardia
	Assessment method:	Option 1: Calculate the number of fuel dispensing systems Option 2: Calculate the number of fuel dispensing systems per inhabitants Option 3: Calculate the number of fuel dispensing systems per area
	Territorial Scale:	All
	Standards or references:	Regione Lombardia, Economic development General Direction
C.1.9	**Road Safety**	
	Intent:	To assess the Plan's ability to help reduce accident rates through rationalization forecasts, upgrading and safety of the road network delegated to provincial and local plans
	Indicator:	Recognition in the five years of monitoring, of the number of road accidents, by measuring the change in the number of traffic accidents in reference to the regional territory
	Unit of measure:	n ; n/km ; n/inhabitants
	Information sources:	Monitored data
	Assessment method:	Evaluate data processing in the monitoring five year period
	Territorial Scale:	All
	Standards or references:	Data from the Regional Road Safety Monitoring Center
C.1.10	**Linear infrastructures for mobility**	
	Intent:	To promote a sustainable mobility
	Indicator:	Linear development of roads and railway network
	Unit of measure:	Km
	Information sources:	Data banks
	Assessment method:	Verification of Km of roads and railways in a provincial area
	Territorial Scale:	Large
	Standards or references:	State of Environment Report and Environmental Indicators - ARPA Piemonte: http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/uso-delle-risorse/trasporti_infrastrutture-lineari-di-trasporto

C1.11	Modal split of public transport	
	Intent:	To determine ratio of public transport to other motorised forms of transport
	Indicator:	Modal split of public passenger transport
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the percentage share of the public mode of transport in total inland transport, expressed in passenger-kilometres (pkm). It is based on transport by passenger cars, buses and coaches, and trains. All data should be based on movements on national territory, regardless of the nationality of the vehicle.
	Territorial Scale:	All
	Standards or references:	Eurostat's sustainable development indicators (Theme 7, indicator 2). http://ec.europa.eu/eurostat/tgm/mapToolClosed.do;jsessionid=vzau-2ZfDrZZujqz-naJ53eGUDNIqTSGSjtlKezAXZpGrF3ZAHdC!-66628538?tab=map&init=1&plugin=1&language=en&pcode=tsdtr210&toolbox=types
C1.12	Critical infrastructures	
	Intent:	To reduce the number of critical infrastructures
	Indicator:	Number of critical infrastructures
	Unit of measure:	Number
	Information sources:	Data available from Regions
	Assessment method:	Calculate the number of critical infrastructures. They are essential elements for the maintenance of vital functions of society, health, safety and economic and social welfare of citizens. Their disruption or destruction would have a significant impact due to a failure to maintain these functions
	Territorial Scale:	All
	Standards or references:	COUNCIL DIRECTIVE 2008/114/EC
C.1.13	Car sharing	
	Intent:	To decrease the use of individual car
	Indicator:	Number of car sharing users or share in total journeys
	Unit of measure:	%; number
	Information sources:	Calculated data
	Assessment method:	Option 1: Calculate the sum of car shared journeys over the total number of journeys Option2: Calculate the number of car shared journeys
	Territorial Scale:	Small to medium
	Standards or references:	Local authorities responsible for transport organisation and non for profit organisation of the social sector organising transport on demand service

C.1.14	Social tariff and gratuity and free of charge transportation	
	Intent:	To ease the access to public transports
	Indicator:	Existence of social tariff
	Unit of measure:	Number
	Information sources:	Calculated data
	Assessment method:	Sum of social tariffs or free of charge options
	Territorial Scale:	All
	Standards or references:	Study on transports (plan de déplacements in France), local authorities responsible for transport organisation

C2	LEISURE SERVICES	
C.2.1	Free time facilities	
	Intent:	To measure the provided local amenities
	Indicator:	Number of youth clubs/association
	Unit of measure:	Number
	Information sources:	Measured data
	Assessment method:	Information office of the municipality, maps (∑ youth clubs-association / number of youth (0-18 years) * 1000
	Territorial Scale:	All
	Standards or references:	Bayerische Verwaltung für Ländliche Entwicklung - Vitalitäts-Check 2.0 zur Innenentwicklung für Dörfer und Gemeinden Leitfaden
C.2.2	Leisure- and recreation-space for settlement area	
	Intent:	To monitor how much near-natural recreation area is provided for the people
	Indicator:	Area of developed near-natural recreation space
	Unit of measure:	ha developed near-natural recreation area / 1,000 inhabitants
	Information sources:	Calculated data
	Assessment method:	Calculate the sum of the area (ha) for footpaths in forests and on meadows plus the area for public garden and lawn etc. etc. (all public and developed space surrounded by nature) divided by the number of thousand inhabitants of the municipality (2,400 people = 2.4 thousand people)
	Territorial Scale:	Medium
	Standards or references:	https://www.lustat.ch/indikatoren/staedtevergleich/kultur-und-freizeit/erholungsraum Municipal zoning plan, municipality statistic Institute

C3	HEALTH SERVICES	
C.3.1	**Coverage ratio of emergency services**	
	Intent:	To assess the ease of access for a potential development on the site to emergency police, fire or health services in the neighbourhood
	Indicator:	Coverage ratio of emergency services
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	25 points if there is civil protection 25 points if there are health services 25 points if there are firefighters 25 points if there are police forces full points if they are within the territorial unit, reduced to two-thirds within close proximity, reduced to one third if distant.
	Territorial Scale:	All
	Standards or references:	Local government planning department
C.3.2	**Number of doctors in the territory**	
	Intent:	To assess the accessibility to healthcare
	Indicator:	Doctors presence on the territory
	Unit of measure:	n / inhabitant
	Information sources:	Calculated data
	Assessment method:	Calculate the number of doctors for inhabitants
	Territorial Scale:	Small
	Standards or references:	Regional health agency depending from the State Department (ARS in France) to get the number of doctors, National statistic institute responsible for the general population census (INSEE in France)
C.3.3	**Housing for elderly people**	
	Intent:	To measure the availability of housing for elderly people
	Indicator:	Places in old people's home
	Unit of measure:	Number
	Information sources:	Measured data
	Assessment method:	(∑ existing beds / Inhabitant) * 1000 Existing beds in: assisted living homes for seniors, nursing homes for seniors
	Territorial Scale:	All
	Standards or references:	Municipality's maps for institutions for assisted living or nursing homes of the municipality

C.3.4	Medical provision	
	Intent:	To measure the medical care
	Indicator:	Available beds in hospital per inhabitants
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	(∑ existing beds / Inhabitant) * 100
	Territorial Scale:	All
	Standards or references:	Open Data Lombardia, Welfaret General Direction, Data from hospitals of the municipality

C4	EDUCATION	
C.4.1	Presence of a school transport vehicles	
	Intent:	To ensure the presence of the school transport vehicles in the area
	Indicator:	Presence of the school transport vehicles
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the percentage of students transported by a school transport vehicles on the total number of students
	Territorial Scale:	Small
	Standards or references:	Urban Plan for Sustainable Mobility
C.4.2	Educational farms	
	Intent:	Increase environmental friendly culture
	Indicator:	Educational farms on total farms
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the number of educational farms over the total number of farms in the area. Educational farms are farms engaged in educating the public, especially for school groups and young people within their school and extracurricular activities. Regionally accredited companies are included in the Network of Educational Farms
	Territorial Scale:	All
	Standards or references:	Regione Lombardia. Agricolture General Direction

C5	EFFICIENCY OF INFRASTRUCTURES	
C.5.1	District heating density	
	Intent:	To save energy
	Indicator:	Proportion of connected segments of district heating in the territory
	Unit of measure:	Number/km
	Information sources:	Use of statistics on local energy provider's data
	Assessment method:	Calculate the number of connected households related to km of district heating network
	Territorial Scale:	All
	Standards or references:	Technical standard, Database of the national district heating grid
C.5.2	District heating network	
	Intent:	To save energy
	Indicator:	Proportion of people that have district heating compared to all of the inhabitants
	Unit of measure:	%
	Information sources:	Use of statistics on local energy provider's data
	Assessment method:	Calculate the proportion of people that have district heating compared to all of the inhabitants
	Territorial Scale:	All
	Standards or references:	Technical standard, Database of the national district heating grid
C.5.3	Efficiency in the distribution of water for human consumption	
	Intent:	To reduce water consumption
	Indicator:	Water delivered over the total introduced into distribution networks
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the percentage of delivered water to the total water introduced into municipal distribution networks
	Territorial Scale:	Small
	Standards or references:	Data provided by ISTAT, National Institute for Statistics

C.5.4	Flexible energy capacity	
	Intent:	To shave energy demand peaks
	Indicator:	Ratio of potential capacity over energy demand
	Unit of measure:	%
	Information sources:	Data from energy providers and small generation systems installed in the area
	Assessment method:	The total potential capacity is calculated as the sum of all the energy stored in the non-peak hours and the shifted load (i.e., surplus from surrounding buildings/areas). The potential capacity is divided by the hourly energy consumed in the area during peak load areas, and multiplied by 100 to obtain a percentage value.
	Territorial Scale:	Small
	Standards or references:	From NewTREND Project D2.2

C6	INFORMATION AND COMMUNICATION	
C.6.1	Broadband supply	
	Intent:	To measure the dwelling with access to broadband supply
	Indicator:	Share of households with a linkage to broadband > 2048 kBit/s
	Unit of measure:	%
	Information sources:	Statistic data
	Assessment method:	Calculate the share of households with a linkage to broadband > 2048 kBit/s / ∑ households in the community
	Territorial Scale:	All
	Standards or references:	Statistic data of the Bayerisches Breitbandzentrum (Bayerisches Staatsministeium der Finanzen, für Landesentwicklung und Heimat), Broadband connection maps by government or service provider
C.6.2	Cell phone connection	
	Intent:	To ensure comprehensive cell phone connection
	Indicator:	Number of cell phone connections in the area
	Unit of measure:	Number/km² ; %
	Information sources:	Statistic data, measurement, maps by government or service provider,
	Assessment method:	Option 1: Number of cell phone connections in the area Option 2 Area covered by the service on the total considered area
	Territorial Scale:	All
	Standards or references:	Mobile phone network, Global System for Mobile Communications (GSM)

C.6.3	Ultra-wide band supply	
	Intent:	To measure the dwelling with access to Ultra-wide band supply
	Indicator:	Households with a linkage to Ultra-wide band > 100 Mbps
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the percentage of households with a linkage to Ultra-wide band > 100 Mbps related to the ∑ households in the community
	Territorial Scale:	All
	Standards or references:	Ministry of Economic Development, Infratel Italia (Italy)

C7	BASIS-INFRASTRUCTURE	
C.7.1	Sewerage connection degree	
	Intent:	To measure the connection degree households to the waste water system
	Indicator:	Degree of connection to the waste water system
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the number of households connected to the system divided by the total number of households of the municipality
	Territorial Scale:	All
	Standards or references:	http://www.eea.europa.eu/data-and-maps/indicators/urban-waste-water-treatment/urban-waste-water-treatment-assessment-3 Waste water system manager / waste water system plan and municipality statistics
C.7.2	Sewerage system size	
	Intent:	To monitor / compare how much sewage pipe (and therefor highly costs) is needed for the waste water of the people
	Indicator:	Length of sewage pipe needed per household
	Unit of measure:	m/n
	Information sources:	Calculated data
	Assessment method:	Calculate the total system length of sewage pipe divided by number of households
	Territorial Scale:	All
	Standards or references:	https://www.publicconsulting.at/fileadmin/user_upload/media/umweltfoerderung/Dokumente_Betriebe/Wasser_Betriebe/Studien_Wasserwirtschaft/Branchenbild_2016.pdf Waste water system manager, waste water system plan and municipality statistics

C.7.3	Sewerage system condition	
	Intent:	To monitor how much of the waste water system (and therefor highly costs) has to be replaced soon
	Indicator:	Share of system older than 30 years
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the length of the waste water system which is older than 30 years divided by the total length of the waste water system
	Territorial Scale:	All
	Standards or references:	https://www.publicconsulting.at/fileadmin/user_upload/media/umweltfoerderung/Dokumente_Betriebe/Wasser_Betriebe/Studien_Wasserwirtschaft/Branchenbild_2016.pdf Waste water system manager, waste water system plan and municipality statistics

C.7.4	Street lighting network size	
	Intent:	To monitor / compare the size (points of light) of the street lighting network
	Indicator:	Points of light
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the number of points of light for street lighting divided by the number of inhabitants
	Territorial Scale:	Medium
	Standards or references:	Infrastructure manager, plan of streets and municipality statistics

6.4 D- SOCIETY

D1	DEMOGRAPHY	
D.1.1	**Employment rate of young people (15-24 years old)**	
	Intent:	Assess the youth employment situation
	Indicator:	People employed aged 15-24 years
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the percentage of people employed aged 15-24 years on the whole population in the relevant age class
	Territorial Scale:	All
	Standards or references:	Data provided by ISTAT, National Institute for Statistics (Italy)
D.1.2	**Employment rate (20-64 years old)**	
	Intent:	To reduce unemployment
	Indicator:	Employed people (20-64 years old) rate on the whole population in the relevant age class
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the ratio between employed people of 20-64 years old and the total population of 20-64 years old. Employed people are those who have worked and have been paid for at least 1 hour during the week of the interview
	Territorial Scale:	Large
	Standards or references:	Data provided by ISTAT, National Institute for Statistics, Census or interviews to families, EUROSTAT http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=t2020_10&plugin=1
D.1.3	**Balance of migration (immigration flows) over the last 5 years**	
	Intent:	To monitor the compatibility of immigration
	Indicator:	Number of immigrants
	Unit of measure:	Number
	Information sources:	Statistic data
	Assessment method:	(∑ immigrants / Inhabitant) * 1000 Calculate that for the last 5 years includes EU immigrants
	Territorial Scale:	All
	Standards or references:	Statistical Institutes

D.1.4	Unemployment rate	
	Intent:	To measure the extent to which persons are able to find a job
	Indicator:	Yearly average unemployment rate
	Unit of measure:	%
	Information sources:	Statistic data
	Assessment method:	Measuring the extent to which persons are able to find a job
	Territorial Scale:	All
	Standards or references:	Data provided by Arbeitslosenstatistik, Landesverwaltung Liechtenstein, Statistik Liechtenstein - Indikatoren für eine nachhaltige Entwicklung 2016

D.1.5	Emigration	
	Intent:	To monitor the degree of emigration
	Indicator:	Number of emigrants (per 1,000 inhabitants and year)
	Unit of measure:	n / 1,000 inhabitants in the year YYYY
	Information sources:	Calculated data
	Assessment method:	Calculate the number of people in the resident registration database who deregistered their place of residence from a certain municipality in the year YYYY
	Territorial Scale:	Small
	Standards or references:	Measured data, Bayerische Verwaltung für Ländliche Entwicklung - Vitalitäts-Check 2.0 zur Innenentwicklung für Dörfer und Gemeinden Leitfaden, Resident registration or Municipality

D.1.6	Young people neither in employment nor in education or training	
	Intent:	To assess the unemployment situation of young people on the territory including the unemployed and the "inactive" young people
	Indicator:	Percentage of NEET young people (aged 18-24 years) on the whole population in the relevant age class
	Unit of measure:	%
	Information sources:	Statistics data
	Assessment method:	Calculate the percentage of NEET people aged 18-24 years (unemployed young people + inactive young peole) on the whole population in the relevant age class
	Territorial Scale:	All
	Standards or references:	Data from the EU Labour Force Survey (EU LFS), EUROSTAT http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=edat_lfse_20&lang=en

D2	SOCIO-ECONOMIC ASPECTS	
D.2.1	**Accessibility of disabled people to social housing**	
	Intent:	To assess that the policies ensures the mixitè of population
	Indicator:	Percentage of social housing accessible to disabled people
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the percentage of social housing accessible to disabled people
	Territorial Scale:	All
	Standards or references:	CCL CESBA ALPS
D.2.2	**Evaluation of the fuel poverty**	
	Intent:	To assess the level of fuel poverty on the territory and with it, economic fragility and dependence to energy prices
	Indicator:	People spending more than the Local Reference Value of income in energy bills, building and transport
	Unit of measure:	%
	Information sources:	Local/regional statistics, studies
	Assessment method:	Calculate the percentage by national standardised method to evaluate the revenue and the energy expenditure
	Territorial Scale:	Large
	Standards or references:	CCL CESBA ALPS
D.2.3	**Poverty and social exclusion**	
	Intent:	To assess the state of people's well being
	Indicator:	The at-risk-of-poverty rate is the percentage of persons living in households in which disposable income (including social transfers and pensions) is below the at-risk-of-poverty threshold (60% of median of disposable income of all households)
	Unit of measure:	%
	Information sources:	Statistical data.
	Assessment method:	Data and Methods of EU regulations, EU SILC Methodology
	Territorial Scale:	Large
	Standards or references:	Statistical Office of Republic of Slovenia, Eurostat

D.2.4	Quality of life - Satisfaction	
	Intent:	To assess the opinion of inhabitants about their well being
	Indicator:	Life satisfaction
	Unit of measure:	%
	Information sources:	Statistical data (via surveys)
	Assessment method:	Evaluate life satisfaction measuring the subjective level of general satisfaction of the population (belongs among the most important expressions of the well-being of individuals). Showing share of satisfied people (very satisfied /satisfied)
	Territorial Scale:	Large
	Standards or references:	Regulation (EC) nr. 1177/2003, Eurobarometer, EU SILC Methodology

D.2.5	Rate of reported robberies	
	Intent:	To assess the urban security and crime prevention
	Indicator:	Reported robberies
	Unit of measure:	n / inhabitants
	Information sources:	Measured data
	Assessment method:	Calculate the number of robberies reported over 10.000 inhabitants
	Territorial Scale:	Small
	Standards or references:	Data provided by ISTAT, National Institute for Statistics

D.2.6	Commuter balance	
	Intent:	To monitor the balanced relation of working and living
	Indicator:	Percentage of employed out of the Municipality
	Unit of measure:	%
	Information sources:	Statistic data
	Assessment method:	Calculate the percentage of employed out of the Municipality over the total employed
	Territorial Scale:	All
	Standards or references:	Bayerische Verwaltung für Ländliche Entwicklung - Vitalitäts-Check 2.0 zur Innenentwicklung für Dörfer und Gemeinden Leitfaden

D.2.7	**Satisfaction with time distribution**	
	Intent:	To find about the inhabitants opinion about their use of time
	Indicator:	Satisfaction with distribution of time
	Unit of measure:	Measured data (Index)
	Information sources:	Statistical gathered data (via surveys)
	Assessment method:	Evaluate the satisfaction of adults with distribution of time between work and other things in life. The average assessment is on the scale from 0 (very dissatisfied) to 10 (very satisfied)
	Territorial Scale:	Large
	Standards or references:	Methodology by European Social Survey (ESS)
D.2.8	**Urban/ rural classification**	
	Intent:	To show the urban/rural nature of areas
	Indicator:	Share of population living in urban/rural areas
	Unit of measure:	%
	Information sources:	Statistical data
	Assessment method:	Calculate the number of people living in urban/rural areas divided by all inhabitants
	Territorial Scale:	All
	Standards or references:	Statistical Office of Republic of Slovenia
D.2.9	**Share of social housing in the territory**	
	Intent:	To ease access to social housing
	Indicator:	Share of social housing
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	(Number of social housing/total housing stock) *100
	Territorial Scale:	Small
	Standards or references:	State Department for housing (MEDDE/DGALN/DHUP for France as regard to respect to social housing law), National statistic institute (INSEE - FILOCOM in France) for large scale
D.2.10	**Part of unacceptable and substandard housing in the territory**	
	Intent:	To assess unfit housing
	Indicator:	Share of unfit housing
	Unit of measure:	%
	Information sources:	Statistic data
	Assessment method:	(number of unfit housing/total stock)*100
	Territorial Scale:	Small
	Standards or references:	State Department for housing (MEDDE/DGALN/DHUP for France and data from the ORTHI tool or PPPI provided by ANAH)

D.2.11	Social water tariff	
	Intent:	To ease access to a public first necessity good
	Indicator:	Percentage of population covered by a social tariff
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	(population of cities covered by a social tariff/total population)*100
	Territorial Scale:	All
	Standards or references:	State Department for environment, energy and sea, national association for local authorities and public service concession, general census from national institute of statistic (INSEE in France)

D.2.12	Wage differences between women and men	
	Intent:	To maintain gender equality in the labour market
	Indicator:	Median wage of women to that of men
	Unit of measure:	%
	Information sources:	Statistic data
	Assessment method:	Calculate the ratio of the median wage of women to that of men
	Territorial Scale:	All
	Standards or references:	Data provided by Lohnstatistik, Landesverwaltung Liechtenstein, Statistik Liechtenstein - Indikatoren für eine nachhaltige Entwicklung 2016

D.2.13	Recipients of economic social assistance	
	Intent:	To control poverty
	Indicator:	Clients of the total population
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the percentage of the clients of the total population
	Territorial Scale:	All
	Standards or references:	Data provided by Amt für Soziale Dienste, Rechenschaftsbericht der Regierung, Landesverwaltung Liechtenstein, Statistik Liechtenstein - Indikatoren für eine nachhaltige Entwicklung 2016

D.2.14	Education	
	Intent:	To analyse the rate of population with at least secondary education (important for wellbeing)
	Indicator:	Population with at least secondary education
	Unit of measure:	%
	Information sources:	Statistical data
	Assessment method:	Calculate the percentage of the population with at least secondary education divided by all inhabitants
	Territorial Scale:	All
	Standards or references:	Statistical Office of Republic of Slovenia

D.2.15	Environmental education	
	Intent:	Percentage of schools with environmental education / graduates served
	Indicator:	Population with environmental/sustainability education
	Unit of measure:	%
	Information sources:	Statistical data
	Assessment method:	Calculate the percentage of population with at least environmental education divided by total number of inhabitants
	Territorial Scale:	All
	Standards or references:	http://www.uis.unesco.org/Education/Documents/43-indicators-to-monitor-education2030.pdf

D.2.16	Level of school dropout	
	Intent:	To minimize the school dropout in the territory for elementary and low high school
	Indicator:	School dropouts rates
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the ratio between school dropout and the total number of students
	Territorial Scale:	All
	Standards or references:	Data provided by ISTAT, National Institute for Statistics (Italy)

D.2.17	Rate of university graduate	
	Intent:	Evaluate the educational level
	Indicator:	Rate of university graduate
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the number of university graduate over the total inhabitants
	Territorial Scale:	Small
	Standards or references:	Data provided by ISTAT, National Institute for Statistics (Italy)

D.2.18	Rate of high school graduate	
	Intent:	Evaluate the educational level
	Indicator:	Rate of high school graduate
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the number of high school graduate over the total inhabitants
	Territorial Scale:	Small
	Standards or references:	Data provided by ISTAT, National Institute for Statistics (Italy)

D.2.19	Occupation by gender	
	Intent:	Pursuit of occupations corresponding to training and competencies
	Indicator:	Employed women compared to the employed men
	Unit of measure:	%
	Information sources:	Statistic data
	Assessment method:	Calculate the share of the employed women compared to the employed men
	Territorial Scale:	All
	Standards or references:	Data provided by Arbeitslosenstatistik, Landesverwaltung Liechtenstein, Statistik Liechtenstein - Indikatoren für eine nachhaltige Entwicklung 2016

D.2.20	Gross Income	
	Intent:	To increase income for habitants
	Indicator:	Per capita gross income (or Economic Value Added, EVA)
	Unit of measure:	Euro/inhabitant
	Information sources:	Statistic data
	Assessment method:	Calculate disposable income in current market values: sources of primary income, income resulting from gross operating surplus, mixed income, employment income, net income from capital and redistribution (through current taxes, social benefits, social contributions, other net transfers) related to the inhabitants
	Territorial Scale:	Large
	Standards or references:	Unioncamere (Chambers of Commerce Union), Annuario Statistico regionale Lombardia - Regional Statistics Annual Report Lombardia - SEC 2010 - UN global list of SDG indicators, EUROSTAT

D.2.21	**Affordability of residential rental or cost levels**	
	Intent:	To assess whether rents or costs of residential units in the Design will be affordable for the target market
	Indicator:	Affordability of residential occupancies relative to average income
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the total occupancy cost (rental or total charges and upkeep of a purchased unit) as a percentage of modal household income in the area
	Territorial Scale:	All
	Standards or references:	SBTool iiSBE International
D.2.22	**Property of the population and economic security**	
	Intent:	To monitor the economic situation, larger consumption has a positive impact on well-being
	Indicator:	Household financial assets per capita
	Unit of measure:	€ per capita
	Information sources:	Monitored data
	Assessment method:	Calculate the household financial assets per capita that cover all financial assets available to households
	Territorial Scale:	Large
	Standards or references:	Eurostat, Statistical Office of Republic of Slovenia, Bank of Slovenia, Methodology by the European System of National and Regional Accounts (ESA 2010)
D.2.23	**Improvement of the building stock of lower income people**	
	Intent:	To assess the efforts of the territory to reduce fuel poverty
	Indicator:	Number of dwellings of modest people renovated
	Unit of measure:	Number
	Information sources:	Local monitoring, statistics, subsidies form state, counties and local authorities
	Assessment method:	Calculate the number of housing renovation project with subsidies for lower income people per year using list of policies and subsidies concerning modest people
	Territorial Scale:	Large
	Standards or references:	Cera (Regional Economic observatory in Rhône Alps)

D.2.24	Early leavers from education and training	
	Intent:	To limit social exclusion and poverty risk, to ease the access in the labour market
	Indicator:	Share of early leavers from education and training
	Unit of measure:	%
	Information sources:	Statistic data
	Assessment method:	Percentage of the population aged 18–24 with at most lower secondary education and who were not in further (formal or non-formal) education or training during the last four weeks preceding the survey. Lower secondary education refers to ISCED (International Standard Classification of Education) 2011 level 0–2 for data from 2014 onwards and to ISCED 1997 level 0–3C short for data up to 2013. The indicator is based on the data from the EU Labour Force Survey (EU LFS).
	Territorial Scale:	All
	Standards or references:	UN global list of SDG indicators, EUROSTAT (online data code: edat_lfse_02)

D.2.25	Poverty and social exclusion	
	Intent:	To assess the state of people's well being
	Indicator:	The at-risk-of-poverty rate
	Unit of measure:	%
	Information sources:	Statistical data.
	Assessment method:	Percentage of persons living in households in which disposable income (including social transfers and pensions) is below the at-risk-of-poverty threshold (60% of median of disposable income of all households). Data and Methods of EU regulations, EU SILC Methodology
	Territorial Scale:	Large
	Standards or references:	Statistical Office of Republic of Slovenia, EUROSTAT http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=t2020_50&plugin=1

D3	CULTURAL ASPECTS	
D.3.1	**Degree of promotion of the cultural offer of the State Institutes**	
	Intent:	Dissemination of cultural activities
	Indicator:	Visitors of the State Institutes of Antiquities and Art
	Unit of measure:	n
	Information sources:	Measured data
	Assessment method:	Calculate the number of paying visitors of the State Institutes of Antiquities and Art as compared to those non-paying
	Territorial Scale:	Small
	Standards or references:	Data provided by ISTAT, National Institute for Statistics
D.3.2	**Degree of diffusion of theatre and musical shows**	
	Intent:	Dissemination of theatre and musical activities
	Indicator:	Diffusion of theatre and musical activities
	Unit of measure:	n / 100 inhabitants
	Information sources:	Measured data
	Assessment method:	Calculate the number of tickets sold for theatre and musical activities every 100 inhabitants
	Territorial Scale:	Small
	Standards or references:	Data provided by ISTAT, National Institute for Statistics
D.3.3	**Cultural institutions**	
	Intent:	To compare the development of the territories in culture sector
	Indicator:	Cultural capital
	Unit of measure:	Nr. of cultural institutions per inhabitants
	Information sources:	Statistical data
	Assessment method:	Calculate the number of cultural institutions divided by all inhabitants and multiplied by 10.000
	Territorial Scale:	All
	Standards or references:	Statistical Office of Republic of Slovenia
D.3.4	**Public libraries**	
	Intent:	Increase services for inhabitants
	Indicator:	Number of public libraries on inhabitants
	Unit of measure:	Number/inhabitants
	Information sources:	Measured data
	Assessment method:	Calculate the number of public libraries in the territory related to the inhabitants
	Territorial Scale:	All
	Standards or references:	Open Data Lombardia, Lombardy Region Culture Direction

D.3.5	Cultural heritage enhancement	
	Intent:	To promote local cultural heritage
	Indicator:	Patrimony open to public
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the number of sites opened to public over the total number of sites of interest
	Territorial Scale:	Small
	Standards or references:	Regional inventory for cultural patrimony, Local authorities and touristic offices, general inventory for cultural patrimony produced by the regional Council

D4	LAND USE	
D.4.1	Plan of land use	
	Intent:	To raise awareness for the need of gentle use of land
	Indicator:	Housing and traffic area compared (resp. In relation) to area used for eco-friendly food production and recreation
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the housing and traffic area in relation to the sum of agriculture, recreation, housing and traffic area. Evaluate the development / change compared to the previous year
	Territorial Scale:	Small
	Standards or references:	Geographic information system (GIS) database, Municipal Plan of land use
D.4.2	Green urban areas	
	Intent:	To reduce diminishing of the urban green areas
	Indicator:	Urban green areas
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Measured the percentage of surface of urban green areas divided by total urban area
	Territorial Scale:	Small
	Standards or references:	EU project GREENKEYS, Slovenian legislation about the content of land use plans, Land use Plans made by municipality

D5	ANTROPOGENETIC RISKS	
D.5.1	**Forest fire risk**	
	Intent:	Reducing risks
	Indicator:	Forest surface in different levels of fire risk
	Unit of measure:	%
	Information sources:	Models and simulation
	Assessment method:	Calculate the ratio between the forest area in different levels of fire risk related to the total municipal area. The risk of forest fires takes into consideration the probability of the occurrence of fire and also the vulnerability of the territory
	Territorial Scale:	All
	Standards or references:	Regione Lombardia. Civil Protection Direction, PRIM - integrated risk mitigation regional programme
D.5.2	**Location of territory relative to zones of fire risk**	
	Intent:	To assess the risk of the project site being subject to forest or bush fires
	Indicator:	Presence of areas of high fire risk
	Unit of measure:	m
	Information sources:	Measured data
	Assessment method:	Calculate the distance from areas of high fire risk
	Territorial Scale:	Large
	Standards or references:	Site analysis report, local government planning department, environmental agencies, non government organization, SBTool iiSBE International
D.5.3	**Risk to occupants and facilities from earthquake**	
	Intent:	To assess the risk to live and property of potential earthquake events
	Indicator:	Risk from earthquake
	Unit of measure:	Index
	Information sources:	Estimate of the probability
	Assessment method:	Evaluate the predicted ability of structures to withstand the effects of foreseeable earthquake events and the probability of injury or death or property damage in case of earthquake event foreseeable within a 100-year time frame
	Territorial Scale:	Large
	Standards or references:	Technical documents about emergency measures, local planning and/or emergency measures organisations, SBTool iiSBE International

D.5.4	Population exposed to landslide risk	
	Intent:	To limit the risk of landslides in populated areas
	Indicator:	Exposure to landslide risk
	Unit of measure:	inhabitants/km2
	Information sources:	Measured data
	Assessment method:	Evaluate the number of inhabitants per km2 exposed to landslide risk, for classes
	Territorial Scale:	All
	Standards or references:	Data provided by ISTAT, National Institute for Statistics

D.5.5	Population exposed to flood risk	
	Intent:	Limit the risk of floods in populated areas
	Indicator:	Exposure to flood risk
	Unit of measure:	inhabitants/km2
	Information sources:	Measured data
	Assessment method:	Evaluate the number of inhabitants per km2 exposed to floods risk, for classes
	Territorial Scale:	All
	Standards or references:	Data provided by ISTAT, National Institute for Statistics

D.5.6	Population exposed to industrial risk	
	Intent:	Limit the risk of industrial in populated areas
	Indicator:	Inhabitants per km2 exposed to industrial risk for classes
	Unit of measure:	inhabitants/km2
	Information sources:	Models and simulation data provided by Regional and National Institution
	Assessment method:	Calculate the number of inhabitants exposed to industrial risk in the analysed area
	Territorial Scale:	All
	Standards or references:	http://www.regione.piemonte.it/ambiente/siar/sist_informatico.htm

D.5.7	Territory exposed to environmental risks (fire, earthquake, landslide, flood, industrial risk etc)	
	Intent:	Limit the environmental risks due to fire, earthquake, landslide, flood, industrial risk in populated areas
	Indicator:	Inhabitants exposed to environmental risks
	Unit of measure:	inhabitants/km^2
	Information sources:	Statistic data
	Assessment method:	Evaluate the number of inhabitants per km^2 exposed to environmental risks
	Territorial Scale:	All
	Standards or references:	Data provided by ISTAT, National Institute for Statistics (Italian)

D.5.8	Population exposed to natural risks	
	Intent:	Limit the natural risks in populated areas
	Indicator:	Inhabitants exposed to natural risks
	Unit of measure:	inhabitants/km2
	Information sources:	Measured data
	Assessment method:	Calculate the number of inhabitants per km2 exposed to natural risks (fire, landslide, flood)
	Territorial Scale:	All
	Standards or references:	Data provided by ISTAT, National Institute for Statistics

6.5 E-ECONOMY

E1	LOCAL ECONOMY	
E.1.1	**Use of eco/local materials**	
	Intent:	To assess the use of local material and their value chain
	Indicator:	Value of eco/local products produced or sold on the territory
	Unit of measure:	Euros/year ; % GDP
	Information sources:	Studies, survey, data from producers, sellers
	Assessment method:	Option 1: Collect data (production and value) from local producers (minimum the more significant of them) related to the corresponding year Option 2: Calculate the Gross Domestic Product
	Territorial Scale:	Large
	Standards or references:	Cera (Regional Economic observatory in Rhône Alps)
E.1.2	**Companies with social/environmental certification**	
	Intent:	To stimulate sustainability in businesses
	Indicator:	Level of coverage of certified activities
	Unit of measure:	%
	Information sources:	Calculated data by National accreditation agency and accreditation offices
	Assessment method:	Number of companies with environmental/social certification on total number of enterprises
	Territorial Scale:	All
	Standards or references:	Accredia for Italy, Unioncamere (Chambers of Commerce Union), ISO 9001, ISO 14001, EMAS, OHSAS 18001
E.1.3	**Renovation and redevelopment of settlement for production activities abandoned**	
	Intent:	To promote actions, projects and retraining programs in settlements for productive activities decommissioned
	Indicator:	Promotion of production activities decommissioned
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	(S1 / S2) * 100 S1 = surface of the settlements for productive activities decommissioned subject of redevelopment S2 = total area of the settlements for productive activities decommissioned
	Territorial Scale:	All
	Standards or references:	Data provided by ISTAT, National Institute for Statistics

E.1.4	Cover organic meals served in the canteen	
	Intent:	To develop organic agriculture and local food system
	Indicator:	Cover ratio of local and organic meals served in canteen
	Unit of measure:	%
	Information sources:	Statistic data, public market data for local authorities, accountancy data
	Assessment method:	(number of local and organic meals served / total number meals)*100
	Territorial Scale:	All
	Standards or references:	Department for agriculture, food industry and forest

E.1.5	Budget of RES enterprises	
	Intent:	To assess the budget impact of RES sector on local economy
	Indicator:	Budget of RES sector enterprises
	Unit of measure:	Euros/year
	Information sources:	Economic statistics, survey
	Assessment method:	List of society concerned. Collection of their annual budget.
	Territorial Scale:	Large
	Standards or references:	Cera (Regional Economic observatory in Rhône Alps), ECO Obs

E.1.6	Employment in Energy improvement of the building stock	
	Intent:	To assess the employment impact of local building sector activity
	Indicator:	Number of employees of building sector companies
	Unit of measure:	Number; %
	Information sources:	Economic statistics, survey
	Assessment method:	Option 1: List of companies of the building sector on the territory, collection of their number of employees Option 2: Calculate the number of employees of building sector companies over the total number of employed
	Territorial Scale:	Large
	Standards or references:	Cera (Regional Economic observatory in Rhône Alps) , ECO obs, SEAP Alps

E.1.7	Employment in RES enterprises	
	Intent:	To assess the employment impact of RES sector activity
	Indicator:	Number of employees of RES sector enterprises
	Unit of measure:	Number; %
	Information sources:	Economic statistics, survey
	Assessment method:	Option 1: List of society of the RES production sector on the territory, collection of their number of employees Option 2: Calculate the number of the RES production sector over the total number of employed
	Territorial Scale:	Large
	Standards or references:	Cera (Regional Economic observatory in Rhône Alps) , Eco obs
E.1.8	Development of local label	
	Intent:	To promote local companies and social links
	Indicator:	Local labels
	Unit of measure:	Qualitative data
	Information sources:	Chamber of Commerce (CCI), Known labels groups (ex for France : Bistrot de Pays, Maison de Pays)
	Assessment method:	Listing the labels (name of labels)
	Territorial Scale:	All
	Standards or references:	Regional council
E.1.9	Local currencies for local economic systems	
	Intent:	To support local companies and social links
	Indicator:	Number of euro-equivalent circulating local currency
	Unit of measure:	Euro-equivalent
	Information sources:	Calculated data
	Assessment method:	(amount of local currency) * (exchange rate to euro)
	Territorial Scale:	Small
	Standards or references:	Agenda21, Association in charge of local currency development
E.1.10	Local added value	
	Intent:	To monitor the regional / local added value
	Indicator:	Local added value per inhabitant
	Unit of measure:	€ / inhabitant
	Information sources:	Calculated data
	Assessment method:	Calculate local added value per inhabitant using local economics report
	Territorial Scale:	Medium and Large
	Standards or references:	http://www.regionale-wertschoepfung.info/index.php?tpl=page&id=42&lng=de Local economics report

E.1.11	**Labour migration**	
	Intent:	To monitor rate of labour force migration of active inhabitants
	Indicator:	Labour migration index
	Unit of measure:	%
	Information sources:	Monitored data
	Assessment method:	To monitor index of labour force migration of active inhabitants by municipality of work place in comparison to all labour active (without farmers) by municipality of residence in percentage
	Territorial Scale:	All
	Standards or references:	Statistical offices, SURS Slovenian, Statistical Register of Employment
E.1.12	**Train business to sustainable development**	
	Intent:	To develop skills of energy efficiency and renewables systems' installers on the territory
	Indicator:	Labelised installers ("RGE" for France)
	Unit of measure:	Number
	Information sources:	Calculated data
	Assessment method:	Number of labelised installers
	Territorial Scale:	Large
	Standards or references:	Department for environment, energy and sea and their regional services, official registration data from the Department for environment, energy and sea and their regional services
E.1.13	**Green Public Procurement**	
	Intent:	To increase sustainability of goods and services in the public administration
	Indicator:	Percentage of GPP value in relationship with the total public expenditure for goods, services and works per year
	Unit of measure:	%
	Information sources:	Monitored data provided by Regional Institution
	Assessment method:	Verification of the achievement of GPP target value as share of total public expenditure
	Territorial Scale:	All
	Standards or references:	EU GPP Legal and policy Framework: http://ec.europa.eu/environment/gpp/index_en.htm Italian GPP Legal and policy Framework: DM 24/12/2015 (Minimun Environmental Criteria) and National Action Plan: http://www.minambiente.it/pagina/gpp-acquisti-verdi

E.1.14	**Local forest wood supply chain**	
	Intent:	To increase the forest wood use at local level
	Indicator:	Calculate the ratio between the forest wood volume produced at local level and the road length to carry the wood to final use
	Unit of measure:	m3/km
	Information sources:	Measured data
	Assessment method:	Calculate the forest wood volume produced at local level and the road length to carry the wood to final use
	Territorial Scale:	Small
	Standards or references:	Forestry consortium
E.1.15	**Promotion of the building sector**	
	Intent:	To assess the economic impact of building sector on local economy
	Indicator:	Turnover of local building sector companies
	Unit of measure:	Euros/year
	Information sources:	Economic statistics, survey
	Assessment method:	Calculation of the sum of the incomes of building sector companies on the territory related to the year
	Territorial Scale:	Large
	Standards or references:	Cera (Regional Economic observatory in Rhône Alps) , Eco Obs
E.1.16	**Voluntary Carbon Market by forest management**	
	Intent:	To increase local green economy
	Indicator:	Voluntary Carbon Market by forest management
	Unit of measure:	Number/area
	Information sources:	Monitored data
	Assessment method:	Verification of the number of credits. Verification of the extension area
	Territorial Scale:	All
	Standards or references:	EU Project CARBOMARK (LIFE 07 ENV/IT000388) http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=search.dspPage&n_proj_id=3269 VCS - Verified Carbon Standard (www.v-c-s.org) Standard ßNEUTRAL (www.bneutral.eu)

E2	ACTIONS FOR INNOVATION	
E.2.1	**Gross enrolment in the Company Register**	
	Intent:	Promote productivity and development
	Indicator:	New companies registered
	Unit of measure:	n
	Information sources:	Measured data
	Assessment method:	Calculate the number of new companies registered at 31/12 of the year
	Territorial Scale:	All
	Standards or references:	Data provided by ISTAT, National Institute for Statistics
E.2.2	**Training of handscrafts, SMEs incubators**	
	Intent:	To assess the development of local skills in the sustainable construction
	Indicator:	Qualified people
	Unit of measure:	%
	Information sources:	Qualification monitoring data
	Assessment method:	Calculate the percentage of qualified people, verify significance of the data
	Territorial Scale:	Large
	Standards or references:	Cera (Regional Economic observatory in Rhône Alps) , Eco Obs
E.2.3	**Research and Development**	
	Intent:	To measure knowledge based economy and its development
	Indicator:	Index of employment in Research & Development
	Unit of measure:	%
	Information sources:	Statistical data
	Assessment method:	Share of employees in R&D compared to all labour force
	Territorial Scale:	Large
	Standards or references:	Eurostat, Statistical Office of Republic of Slovenia, Statistical Offices
E.2.4	**Financial fund for energy saving in SMEs**	
	Intent:	To promote energy savings in SMEs
	Indicator:	Implementation of an energy saving fund
	Unit of measure:	Euros/GDP
	Information sources:	Calculated data
	Assessment method:	Calculate the total amount of money put in the fund over the gross domestic product
	Territorial Scale:	Small
	Standards or references:	Local Climate and Energy Plan (PCET), national institute for statistics (INSEE)

E.2.5	Involvement of citizens and SMEs to the local life, through local networks, partnerships, etc.	
	Intent:	To assess the financial engagement/participation of citizens and enterprises in local funds/society
	Indicator:	Capital raised by local collective investment funds
	Unit of measure:	Euros
	Information sources:	Studies, survey, data from local funds and citizen organisations
	Assessment method:	Calculate the capital raised by local collective investment funds (crowd funding, citizen organisations…) using list of local funds/organisation
	Territorial Scale:	Large
	Standards or references:	HQE²R

E3	TOURISM	
E.3.1	**Tourism rate**	
	Intent:	To increase touristic presences
	Indicator:	Touristic rate
	Unit of measure:	Days/inhabitant; number/100,000 inhabitants; total tourist nights / (inhabitants x 365 days); attendance (number of nights spent by tourists) / kmq surface of the territory
	Information sources:	Statistic data
	Assessment method:	Option 1: Days spent (by italians and strangers) in the whole accommodation system, per inhabitant Option 2: Calculate the number of tourists over 100,000 inhabitants Option 3: Calculate total tourist nights related to inhabitants per 365 days Option 4: Evaluate the attendance (number of nights spent by tourists) related to the kmq surface of the territory
	Territorial Scale:	Large (province)
	Standards or references:	ISTAT, National Institute for Statistics
E.3.2	**Tourist accommodation capacity**	
	Intent:	To assess the tourism carrying capacity
	Indicator:	Tourist accommodation capacity
	Unit of measure:	Beds per 1,000 inhabitants
	Information sources:	Measured data
	Assessment method:	Evaluate tourist accommodation capacity as the number of beds per 1.000 inhabitants
	Territorial Scale:	All
	Standards or references:	ISTAT, National Institute for Statistics
E.3.3	**Floating population**	
	Intent:	To estimate the modification in the population living in a municipality due to touristic presences
	Indicator:	Overnight staying population in a municipality
	Unit of measure:	n. equivalent inhabitants
	Information sources:	Statistic data
	Assessment method:	Calculate the overnight staying population in a municipality. It doesn't include inhabitants, but it includes people staying in hotel, camping, second homes. An equivalent inhabitant is: - for second homes 1 inhabitant is 1eq .inhabitant; - for hotel/campings 1 occupied bed is 1eq. Inhabitant.
	Territorial Scale:	All
	Standards or references:	SIMON – Systema Informativo Monitoraggio PGT - Monitoring Informatic System for Territorial Governance Plans of Lombardy Municipalities

E.3.4	Tourist attractions	
	Intent:	To measure the free time facilities for tourists
	Indicator:	Number of tourist attractions
	Unit of measure:	Number/km²
	Information sources:	Measured data
	Assessment method:	Calculate the number of tourist attractions per km2 (a tourist attraction is a place of interest)
	Territorial Scale:	All
	Standards or references:	Municipal tourism portals

E.3.5	Bed occupancy rate	
	Intent:	To measure the vacantness of beds
	Indicator:	Bed occupancy rate
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Bed occupancy rate = [booking days / (amount of beds * almanac days)] * 100
	Territorial Scale:	All
	Standards or references:	Municipal tourism portals, Statistical Institutes

E.3.6	Summer tourism	
	Intent:	To develop summer tourism attractiveness to compensate decrease of winter attractiveness
	Indicator:	Summer tourism revenue share
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	(summer tourism revenue) / (winter tourism revenue)
	Territorial Scale:	All
	Standards or references:	touristic syndicates, chamber of ski professional

E.3.7	Touristic cycling pathways	
	Intent:	To develop summer tourism attractiveness to compensate decrease of winter attractiveness
	Indicator:	Touristic cycling pathways of bike routes in the land area
	Unit of measure:	km / km2
	Information sources:	Calculated data
	Assessment method:	Calculate the sum of continuous kilometres of touristic cycling routes over the km2 of land area
	Territorial Scale:	All
	Standards or references:	Study on mobility (ORT, regional observatory on transports), State department responsible for roads and local authorities, touristic syndicates, local authorities

E.3.8	Seasonal staff accommodation	
	Intent:	To tackle housing access for seasonal staff
	Indicator:	Pressure of seasonal staff on housing
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the seasonal staff population over the total population
	Territorial Scale:	Small
	Standards or references:	National statistic studies from general census (INSEE for France) and dedicated studies on seasonal

E.3.9	Ski lifts	
	Intent:	Increase tourism
	Indicator:	Capacity of ski lifts
	Unit of measure:	Number of passengers/hour
	Information sources:	Calculated data
	Assessment method:	Calculate the number of passengers that can be carried by ski lift per hour
	Territorial Scale:	All
	Standards or references:	Open Data Lombardia, Regione Lombardia. Sport and Youngs Direction, Ski resort operators

E.3.10	Agritourism farmhouses	
	Intent:	Increase tourism
	Indicator:	Number of agritourism farmhouses
	Unit of measure:	Number
	Information sources:	Measured data
	Assessment method:	Calculate the presence of agritourism farmhouses in the territory
	Territorial Scale:	All
	Standards or references:	Open Data Lombardia, Regione Lombardia. Agriculture Direction

E.3.11	Mountain huts	
	Intent:	Increase tourism
	Indicator:	Number of mountain huts
	Unit of measure:	Number
	Information sources:	Measured data
	Assessment method:	Calculate the presence of mountain huts in the territory
	Territorial Scale:	All
	Standards or references:	Open Data Lombardia, Regione Lombardia. Sport and Youngs Direction

E.3.12	Touristic flux	
	Intent:	To develop a sustainable tourism
	Indicator:	Number of arrivals in the area; number of nights spent by tourists in accommodation establishments (potential touristic environmental pressures)
	Unit of measure:	Arrivals / year; number of nights spent/year
	Information sources:	Monitored data provided by Regional Institution
	Assessment method:	Option 1: number of arrival in a year; Option 2: number of nights spent in a year
	Territorial Scale:	All
	Standards or references:	State of Environment Report and Environmental Indicators - ARPA Piemonte : http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/uso-delle-risorse/turismo_movimenti-touristici

E.3.13	Average stay of tourists	
	Intent:	To develop a sustainable tourism
	Indicator:	The indicator estimates the average stay of tourists in a territory
	Unit of measure:	Number of nights / number of tourists
	Information sources:	Monitored data provided by Regional Institution
	Assessment method:	Ratio between the number of tourists and the number of nights spent in the territory
	Territorial Scale:	All
	Standards or references:	State of Environment Report and Environmental Indicators - ARPA Piemonte : http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/uso-delle-risorse/turismo_durata-media-permanenza-touristica

E.3.14	Touristic pressure	
	Intent:	To develop a sustainable tourism
	Indicator:	The indicator estimate the touristic pressure in a territory
	Unit of measure:	Number of arrivals / inhabitants; Number of Tourists / inhabitants; Number of Tourists / Km2
	Information sources:	Monitored data provided by Regional Institution
	Assessment method:	Option 1: Ratio between the number of arrivals and the inhabitants; Option 2: Ratio between the number of tourists and the inhabitants; Option 3: Ratio between the number of tourists and territorial area;
	Territorial Scale:	All
	Standards or references:	State of Environment Report and Environmental Indicators - ARPA Piemonte : http://www.arpa.piemonte.gov.it/reporting/core-set-of-indicators/tourism/tourism-intensity

E.3.15	**Presence of paths used for tourism**	
	Intent:	Promote pedestrian tourism activity
	Indicator:	Extension of trails/paths used for tourism
	Unit of measure:	km / km2
	Information sources:	Measured data
	Assessment method:	Calculate the length (Km) of trails/paths used for tourism in the area (km2)
	Territorial Scale:	All
	Standards or references:	Sustainable Tourism Plan
E.3.16	**Sustainable year round tourism**	
	Intent:	To improve the sustainable management of touristic destinations helping to measure sustainability management processes and to monitor their performance and progress over time
	Indicator:	Tourism enterprises/establishments using a voluntary certification/labelling for environmental /quality/sustainability and/or Corporate Social Responsibility
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the number of tourism enterprises using a voluntary certification for the environmental quality over the total number of tourism enterprises in the area
	Territorial Scale:	All
	Standards or references:	ec.europa.eu, http://ec.europa.eu/DocsRoom/documents/21749/attachments/1/translations/en/renditions/native

E4	AGRICULTURE	
E.4.1	**Relevance of intensive agriculture**	
	Intent:	To measure the relevance of intensive agriculture
	Indicator:	Number of agricultural operations
	Unit of measure:	Number; Number/ha
	Information sources:	Statistic data
	Assessment method:	Option 1: Calculate the number of agricultural operations Option 2: Calculate the number of agricultural operations over the local reference area
	Territorial Scale:	All
	Standards or references:	Bayerische Verwaltung für Ländliche Entwicklung - Vitalitäts-Check 2.0 zur Innenentwicklung für Dörfer und Gemeinden Leitfaden
E.4.2	**Organic farming**	
	Intent:	To measure the relevance of the traditional agriculture
	Indicator:	Share of area for organic farming
	Unit of measure:	%
	Information sources:	Statistic data
	Assessment method:	Calculate the percentage of area for organic farming compared to all agricultural area
	Territorial Scale:	All
	Standards or references:	EUROSTAT, Bayerische Verwaltung für Ländliche Entwicklung - Vitalitäts-Check 2.0 zur Innenentwicklung für Dörfer und Gemeinden Leitfaden
E.4.3	**Economic relevance of agriculture**	
	Intent:	To measure the economic relevance of agriculture
	Indicator:	Agricultural employed
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the percentage of agricultural employed on total employed (∑ people working in the agriculture / total employed) * 100
	Territorial Scale:	All
	Standards or references:	Bayerische Verwaltung für Ländliche Entwicklung - Vitalitäts-Check 2.0 zur Innenentwicklung für Dörfer und Gemeinden Leitfaden

E.4.4	**Agricultural population**	
	Intent:	To maintain agriculture on the territory
	Indicator:	Evolution of the number of farmers
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	(value of the year-value of years before)/(value of the year)*100
	Territorial Scale:	All
	Standards or references:	Agreste document, Official registration data of farmers from the State Department (DRAAF in France)
E.4.5	**Circular economy and short food systems**	
	Intent:	To support local agriculture
	Indicator:	Number of short food systems projects, sales (volume) of short food systems
	Unit of measure:	Number; kg/year
	Information sources:	Calculated data
	Assessment method:	Option 1: Calculate the number of short food systems projects Option 2: Calculate the volume of short food systems over the year
	Territorial Scale:	All
	Standards or references:	Statistic data State Department for agriculture and forestry (DRAAF in France), on "Short food systems", "direct sale from the farm", "Maisonde pays"
E.4.6	**Agricultural autonomy potential**	
	Intent:	To maintain agriculture on the territory
	Indicator:	Agricultural area per inhabitant
	Unit of measure:	ha/inhabitant
	Information sources:	Calculated data
	Assessment method:	Calculate the area dedicated to agriculture/inhabitant
	Territorial Scale:	Small to medium
	Standards or references:	Official registration data of farmers from the State Department (DRAAF in France) and general census provided by national institute for statistic (INSEE)

E.4.7	**Field (arable) share of agriculture area**	
	Intent:	To monitor the share of the field (arable) agriculture area
	Indicator:	Area of field over the total
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the area of field (arable) agriculture area divided by total (field and grassland) agriculture area, using statistic agriculture
	Territorial Scale:	All
	Standards or references:	https://www.vorarlberg.at/pdf/agrarstrukturerhebung2014.pdf
E.4.8	**Certified agricultural products**	
	Intent:	Production of agricultural products of quality
	Indicator:	Number of agricultural products of quality
	Unit of measure:	Number
	Information sources:	Calculated data
	Assessment method:	It considers: Protected Designation of Origin (PDO), Protected Geographical Indication (PGI), Quality Wine Produced in a Specified Region (QWPSR), Traditional Speciality Guaranteed (TSG), etc
	Territorial Scale:	All
	Standards or references:	Regione Lombardia, DG Agriculture, Ministry of agriculture
E.4.9	**Food self-sufficiency**	
	Intent:	To determine how much food is being produced regionally / consumed that is regionally produced
	Indicator:	Consumption of locally produced food
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the amount of food consumption of the residents (from consumer-statistic or calculations) related to the production of agriculture from agriculture statistics
	Territorial Scale:	Large
	Standards or references:	http://www.fao.org/3/a-i5222e.pdf Consumer-statistics, Agriculture production statistics

E.4.10	**Genetic diversity in agriculture**	
	Intent:	To preserve the ecosystem
	Indicator:	Proportion of local endangered breeds
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the proportion of local endangered breeds (Horse, cattle, pig, sheep and goat)
	Territorial Scale:	All
	Standards or references:	BMUB - Indikatorenbericht biologische Vielfalt 201, 4Nationwide Red Lists, Nature conservation associations
E.4.11	**Biologically cultivated area**	
	Intent:	Increase biologically cultivated area
	Indicator:	Proportion of biologically cultivated areas
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the area of biologically cultivations (near-natural habitats, meadows, scattered areas and hedges with herbaceous trees) over the total land area
	Territorial Scale:	All
	Standards or references:	Data provided Amt für Umwelt, Landesverwaltung Liechtenstein, Umweltindikatoren 2014 - Umweltstatistik 2014
E.4.12	**Use of pesticides**	
	Intent:	To promote a sustainable Agriculture
	Indicator:	Amount of pesticides used per agricultural area
	Unit of measure:	Kg/hectar
	Information sources:	Statistical data
	Assessment method:	Calculate the ratio between kg of pesticides and Useful Agricultural Area (UAA)
	Territorial Scale:	Large
	Standards or references:	State of Environment Report and Environmental Indicators - ARPA Piemonte: http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/uso-delle-risorse/agricoltura_utilizzo-prodotti-fitosanitari Directive 94/411/CE; EU-COM (2002) 179, EU-COM (2002)349, Dec. 2004/259/EU, Directive 128/2009/EU

E.4.13	Use of fertilizers	
	Intent:	To promote a sustainable Agriculture
	Indicator:	Amount of fertilizers used per agricultural area
	Unit of measure:	Kg/hectar
	Information sources:	Statistical data
	Assessment method:	Calculate the ratio between kg of fertilizers and Useful Agricultural Area (UAA)
	Territorial Scale:	Large
	Standards or references:	State of Environment Report and Environmental Indicators - ARPA Piemonte: http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/uso-delle-risorse/agricoltura_utilizzo-prodotti-fertilizzanti Nitrates Directive 91/676/EU; EU-COM (2002)179, Reg. EU 2003/03

E5	INDUSTRY	
E.5.1	Area for industry	
	Intent:	To measure the correlation between space usages
	Indicator:	Percentage of area for industry
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the percentage of area for industry
	Territorial Scale:	All
	Standards or references:	Land development plan, municipality's maps
E.5.2	Industrial Local Units	
	Intent:	To improve local industrial economy
	Indicator:	Density of industrial activities in the territory
	Unit of measure:	Number/Km2
	Information sources:	Statistical data provided by Regional Institution
	Assessment method:	Verification of the number of industrial activities. Verification of the territorial area (km2). Calculation of the ratio between the number of industrial activities and the territorial area
	Territorial Scale:	Large
	Standards or references:	State of Environment Report and Environmental Indicators - ARPA Piemonte: http://www.arpa.piemonte.gov.it/reporting/indicatori-on_line/uso-delle-risorse/industria_unita-locali
E.5.3	Efficient use of the industrial areas	
	Intent:	To measure the efficient use of the industrial areas
	Indicator:	Degree of use of industrial territorial infrastructure
	Unit of measure:	%
	Information sources:	Calculated data by public authorities with specific competence
	Assessment method:	Square meters of industrial areas actually occupied (not only available or abandoned etc.) related to the total square meters of industrial areas identified by the territorial plan
	Territorial Scale:	All
	Standards or references:	National rules on land use planning

E.5.4	Economic relevance of industry	
	Intent:	To measure the economic relevance of industry
	Indicator:	Industrial employed
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Calculate the industrial employed on the total (∑ people working in the industry / total employed) * 100
	Territorial Scale:	All
	Standards or references:	Data provided by ISTAT, National Institute for Statistics

E.5.5	Resource productivity	
	Intent:	To promote sustainable production to allow economies to grow while reducing their ecological footprints
	Indicator:	Amount of GDP generated by each kg of material consumed
	Unit of measure:	€ / kg
	Information sources:	Statistical data
	Assessment method:	The indicator relates what an economy produces in terms of gross domestic product (GDP) to the materials it uses based on its domestic material consumption (DMC). It is expressed by the amount of GDP generated per unit of material consumed in the geographical area, i.e. GDP/DMC in EUR per kg. The indicator 'domestic material consumption' (DMC) is based on the Economy-wide Material Flow Accounts (EWMFA). The theory of EW-MFA includes compilations of the overall material inputs into the geographical area, the changes of material stock within the economy and the material outputs to other economies or to the environment. EW-MFA covers all solid, gaseous, and liquid materials, except water and air. Water included in products is included.
	Territorial Scale:	Large
	Standards or references:	EUROSTAT (online data code: tsdpc100) http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tsdpc100&plugin=1

E6	TRADE COMMERCE	
E.6.1	**Import/export of food products and beverages**	
	Intent:	Promote the internationalization, productivity and development
	Indicator:	Trade of food products and beverages
	Unit of measure:	%
	Information sources:	Measured data
	Assessment method:	Total import of food products and beverages compared to the export of them
	Territorial Scale:	All
	Standards or references:	Data provided by ISTAT, National Institute for Statistics
E.6.2	**Settlements without grocery stores**	
	Intent:	To reduce the number of settlements without grocery stores
	Indicator:	Number of settlements without grocery stores
	Unit of measure:	%
	Information sources:	Calculated data
	Assessment method:	Calculate the ratio between the number of settlements without grocery stores and the total number of settlements (little, medium and large grocery stores)
	Territorial Scale:	All
	Standards or references:	Open Data Lombardia, Regione Lombardia - DG economical development, commerce association

7 SHARC Methodology

7.1 Introduction Capacity to act as a supplement to measuring KPIs Pilot activities

"Capacity to act" is considered to be the capacity of the community to have sufficient resources or to be able to access them in order to define and achieve their own goals of sustainable development (cf. Holzkamp 1985, p. 243). The local population and the resident companies and organisations constitute a significant "resource". Acting itself is an activity of the actors of a community (cf. Fischer 2005, 468 F.).

What is essential for the capacity to act is that the space created by people's actions and at the same time provides a framework for individual action is understandable to the people (cf. Bollnow 2004, p. 209 f.). In order to meet the requirements of sustainable development, it is necessary to educate citizens (cf. Haan 2008, p. 24) in terms of action orientations (cf. Michelsen 2005, S 143 f.).

The "capacity to act" builds on the concerns of action-oriented social geography. With the consideration of the capacity to act, the procedural and communicative qualities of planning in the community are also raised in terms of planning theory embedding. Confidence building is demanded in the theoretical approach of emotional rationality.

The capacity of actors to act is the basis of sustainable territorial development.

In addition to the three thematic dimensions of ecology, economy and social welfare, the theory of sustainability also includes the cross-sectional normative, operative and analytical dimensions. A significant contribution to sustainable development is also the consideration of the principles of good governance and the participation of citizens, which are also key issues

In the normative dimension of sustainable development, "the people" are addressed as the addressees of the political programs. These cannot be addressed as individual actors for sustainable territorial development. "Society" is not the right address for the normative dimension (cf. Fuchs 2008, p. 6 ff.), since it is not hierarchically organised, it is without leadership, without any representation of its identity. "The society is not addressable, it does not have speakers that represent it in its name. It has no identifiable address to which one contact would be possible e.g. postal [...]" (Fuchs 2008, p. 7).

A first solution could be to look at the organization, to focus on the plurality of units, which have their own factual-, time- and social-dimensions (structure, leadership, internal communication) as well as their own development perspectives and thus open the view of the plurality of sustainability. Organisations can reach binding orders within their units, implement

normative targets and make binding self-descriptions. They have an external address and are therefore capable to communicate; acting can be attributed (cf. Fuchs 2008, p. 11).

"In addition, organizations are designed in terms of what we could call “sustainability”. Their dynamism (based on decision-making) is only possible through a identitary stability, through an internal conservatism, in which the organizations, even though they are dealing with ongoing changes in the world, abide by themselves "(Fuchs 2008, p. 12).

The communities or associations of municipal corporations with their own structure are addressable, acting actors for sustainable territorial development.

These are therefore addressed to:

- To identify their current challenges
- Explain the general objectives and basic attitudes of the community
- Their coordination with higher-level local authorities and their neighbours
- Quality assurance systems including analysis and monitoring to achieve sustainable development
- • Involvement of citizens in spatial planning
- • Confidence-building measures for individual citizens

7.2 SHARC check as a basis for the assessment of territories

SHARC supports communities in dealing with the local and global challenges. The tool is embedded in the theory of sustainability, social geography and planning theory.

SHARC is that it focuses on small communities of up to 30.000 inhabitants using a unique questionnaire system and is based on 8 key themes: Capacities, Housing, Ecology, Mobility, Energy, Social, Economy, and Safety. (These are based on the pillars of sustainable development, good governance, standard spatial planning themes, and Maslow pyramid of human needs).

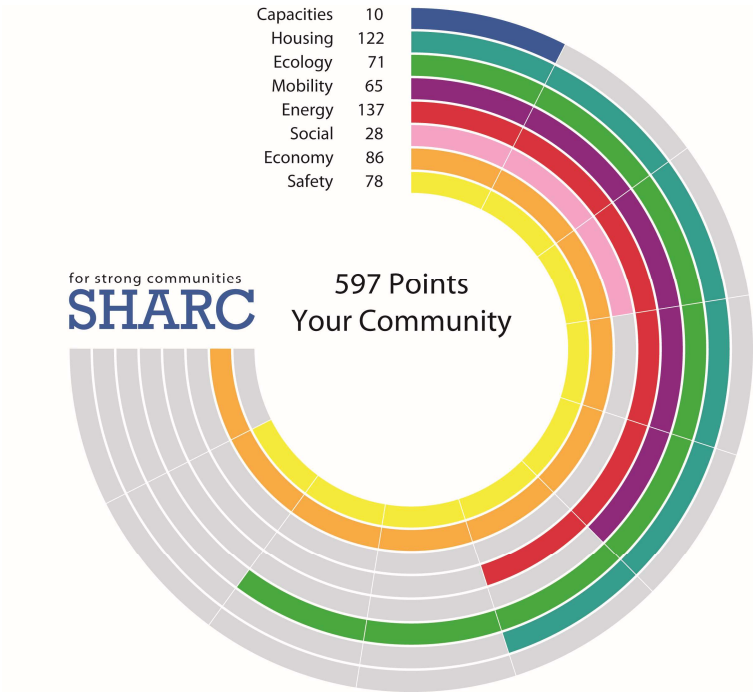
The instrument SHARC has been developed transdisciplinary in three phases within the framework of action research under guidance of Markus Berchtold-Domig. A first draft is based on the theories and existing instruments. The iterative tests in eleven communities took place after ten development rounds. The final version has been brought forward after discussions with stakeholders. The instrument focus on the planning system in Vorarlberg, Austria. SHARC is applicably after minor changes in whole Alpine Space.

SHARC records the current situation of a community according to eight issues and four process steps. The results are represented in a scoring system. The decision makers are interviewed; the results are evaluated and coordinated with the citizens. Finally a report is generated with recommendations for action.

SHARC Check: SHARC Check is a package with a full day assessment program on 8 key themes supported by expert interview to the Mayor and key staff. The results are analyzed on over 15 different aspects. The community receives a report with several suggestions for further developments on a common feedback meeting or workshop.

- **SHARC Services** (SHARC Services offers advisory, solutions, consultancy on the 8 key themes for the community government)

- **SHARC Certification** (SHARC Certification is a long lasting and validated recognition of the qualities on the 8 key themes for the community. It is the bases for awarding, labelling, city marketing and comparing communities. It helps to generate possible state subsidy programs)



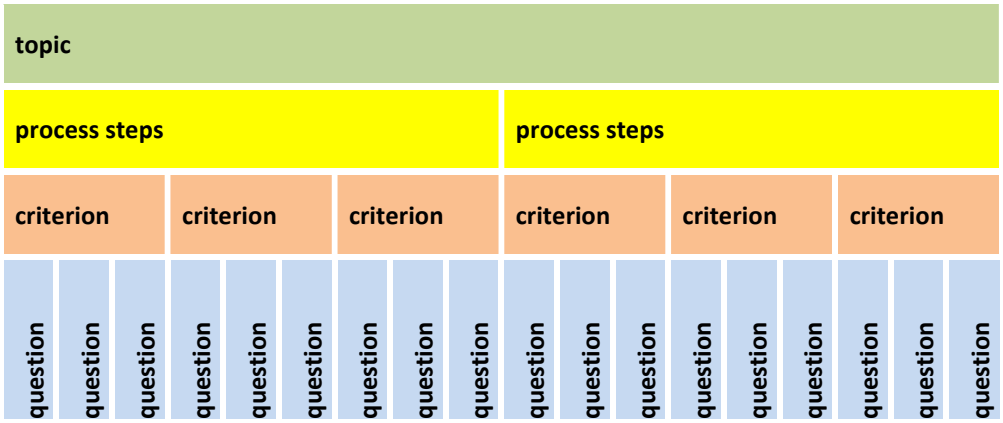
Source: Creation of Graphic design Moosbrugger 2013, own editing 2015

- **SHARC Conference** (SHARC Conference are held annually and deliver awards to the communities as well as allow for networking, learning, sharing experiences and best practices)

7.3 Structure of the SHARC tool

The contents of SHARC are structured according to topics, process steps, criteria and questions. SHARC is structured in layers, where the parent level is the topics, including the process steps, then the criteria and the questions as the bottom level (see fig. 7-1). The current situation in the community is raised by means of questions, this information is then bundled in the above level. Finally, the user gets the state of affairs in the respective topic.

Fig. 7-1 levels of SHARC

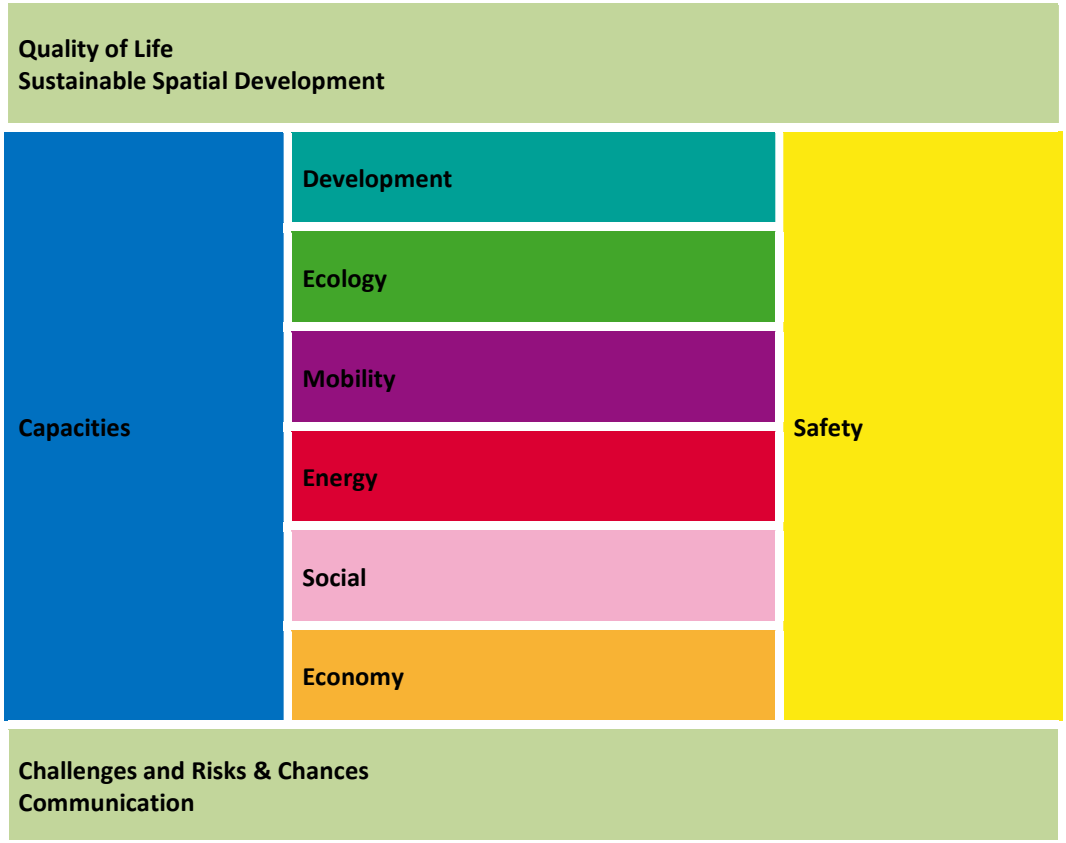


source: own editing 2015

The content of the sustainable development of a community is carried out through the eight topics capacity to act, building development, ecology, mobility, energy, social affairs, economy and security (see fig. 7-2). The eight topics are explained in more detail in chapter 7.2.

The topics of SHARC touch on the quality of life of citizens and aim at sustainable development of the community. On the basis of the current challenges, they draw on the opportunities and risks of the local authority and serve to communicate the necessary steps in the respective thematic areas (see Figure 7-2).

Fig. 7-2 Structure SHARC by Topic

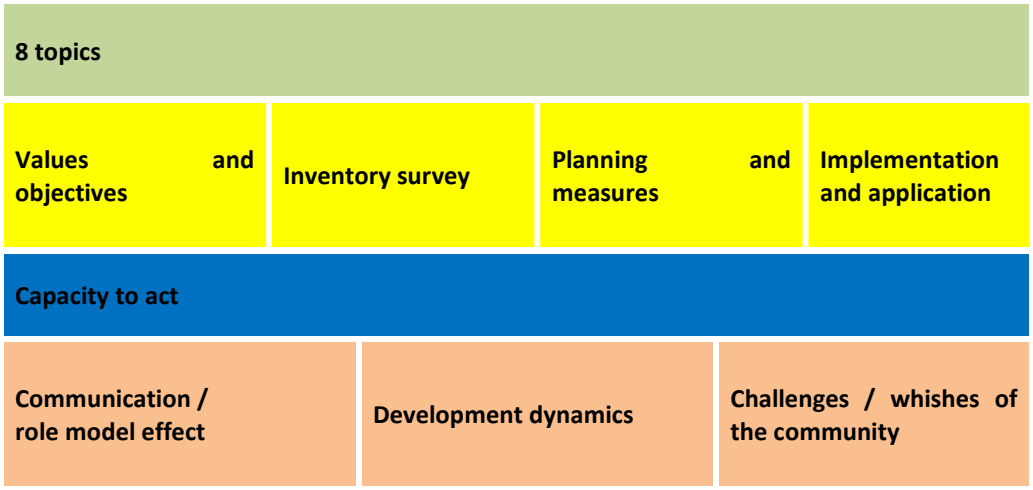


source: own editing 2015

The individual topics, except for the capacity to act, are divided into four process steps (see fig. 7-3). The process step "values and objectives" includes the formulation and commitment to certain values and objectives in the relevant topic with regard to the sustainable development of the local authority. The Process step "inventory survey" collects the actual surveys carried out by the community as well as the current survey in the respective topic. The process step "planning and action description" covers the thematically relevant planning, concepts, regulations and programmes that have been carried out as preparation for the implementation of actions. The process step "implementation and application" is the implementation of measures for the achievement of goals or the application of the intended plans.

The feedback on the questions will be analysed within the framework of SHARC also after the communication activities and exemplary effect of the community as well as the development dynamics existing in the community. Furthermore, an open collection and description of the challenges and wishes of the community is carried out, e.g. to scientific institutions or legally superior local authorities (see Fig. 7-3). These results form a further basis for the analysis of the situation of the community and the development of proposals for action.

Fig. 7-3 structure SHARC by process steps and topics



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7.4 Point system of SHARC

SHARC collects the current situation of a community and presents it with a point system with 1,000 points similar to the KGA (see Chapter 5.6.1) which is established and accepted by the institutions in Vorarlberg. All of the certification systems for quality assessment of spatial development which were selected in digression also come back on a point system (see Chapter 5.5). The number 1,000 is used for reasons of practicality in calculation and communication.

In contrast to word advice, the rating system simplifies the communication of the planning contents to the citizen, whereby the point system as well as the textual description in the communication can be used abusively. Linguistic blurring over the result of the survey can be avoided from the outset. However, it is important to limit the uncertainties and possible abuses which are in the formation of the points, as far as possible.

Furthermore, the rating system enables the comparison of results across multiple surveys, monitoring of planning activities and developments within a community. By means of mathematical operations between the topics and process steps, a comparison is still possible within a community and with other communities. In the case of a sufficient population of surveys, the rating system enables the further scientific development of the community and the functioning of the tool. The rating system can be a good basis for a widespread legitimacy and control of community development. Based on the rating system, funding can be linked to the development of the community like with the KGA tool.

SHARC is divided into eight topics, these are divided into four process steps, which summarize 101 criteria. The fulfilment of the criteria is verified by answering 540 partial open questions. For those questions that are answered positively, points can be credited. The points of the questions are aggregated by the criteria and result in the points for the process steps and these in turn for the topics.
In the sub-levels, more points can be collected than can flow into the superior level. Only the maximum possible number of points per level is relevant for the analysis. The potential overhang of the points serves on the one hand to compensate for partially complementary or excluded measures as well as to cushion the unfavourable conditions of the community against other communities.

The questions are partly open without categorization, partly closed questions on a nominal or ordinal scale or on an interval scale. The results are recorded and transferred to a metric scale. Based on the metric scale, the communities are analysed by means of the topics and process steps.

The initial determination of the maximum number of points per question, criterion, process step and topic is a draft of the author in consultation with the substantive working group. This standard takes the following aspects into account:

- The expenses of a local authority for the performance of the points compared to all other criteria
- The long-term effect of the criterion in relation to the sustainable development of the community in the respective topic
- The comparison to the best possible standard based on the knowledge of so-called lighthouse communities/lighthouse regions
- The comparison to the theoretical-scientifically best possible target achievement
- The ability to communicate the emphasis of the level topic and process steps (80 points is easier to communicate than 76.8 points)

The 1,000 points are distributed over the eight topics as follows:

- Capacity to act (maximum 80 points))
- Building development (maximum 200 points)
- Ecology (maximum 90 points)
- Mobility (maximum 120 points)
- Energy (maximum 240 points)
- Social welfare (maximum 90 points)
- Economy (maximum 90 points)
- Safety (maximum 90 points)

The 1,000 points are distributed over the four process steps as follows:

- Values and objectives (maximum 80 points)
- Inventory survey (maximum 240 points)
- Planning and Action description (maximum 240 points)
- Implementation and application (maximum 360 points)
- (in addition to capacity for action (maximum 80 points))

The fulfilment of the criteria is checked at the key date by a locally assembled team with the involvement of external experts or companions. Elaborations which are more than ten years old are no longer used for analysis.
In principle, the weighting of the criteria is considered to be less important for the development of the tool. If the tool is established, the rating can be changed, for example, by scientific-technical or political-planning requirements depending on the application of the instrument. For the comparison of the survey results appropriate conversions should be made.

For the potential application of SHARC as a certification tool or as a control tool, e.g. for the distribution of financial resources, the certificates to be provided are defined for the fulfilment of the criteria. In addition, there is a distinction between must-and-can questions, i.e. questions that have to be answered positively in terms of content and which can be answered. Attention must be made to the aforementioned uncertainties and possible abuses of the point system.

7.5 Structure of the survey database and the survey sheet

The results of the survey are stored in a database. The structure of SHARC is the basis for structuring. The survey database stores all the responses in the survey as well as the analysiss. The database is used to analyze the inventory and develop recommendations for action to improve the current situation of the community. The survey database also serves the long-term documentation of the community situation and the proof of the correct analysis of the survey. The structure of the survey database is shown in the Appendix Chapter 13.1 as an example of a data record.

Building on the survey database, the survey sheet is developed with approximately 500 questions, which forms the basis for the expert interview. The questionnaire is intended to provide the necessary information for the survey database and, at the same time, to meet the requirements for usability in the best possible way. The processing is done by standardized software programs. The structure of the survey sheet is shown in the appendix chapter 13.2 as an example by means of a data record.

7.6 Application process

The instrument is applied according to a defined procedure (see fig. 7-6). The survey interview is the basis for the entire SHARC process. The recommendations for action are made by the analysis and analysis of the interview. These are discussed, adapted and further developed in an interim meeting with the community leaders.

For pragmatic reasons the decision on the involvement of citizens is incumbent on the decision-makers in the respective community. If the involvement of the citizens is completed within the meaning of the community, a final report is drawn up from the results of each step, which will serve as a catalogue of ideas for the development of the community within the next few years.

The instrument works to a certain extent without the involvement of citizens, even if this does not meet the requirements of the necessary participation in the sense of sustainable development (see Chapter 2.4). The involvement of citizens against the political will of decision-makers is not feasible and would lead to a lack of acceptance of citizens feedback. The involvement of citizens could be counterproductive for the development of a spatial development concept if the application of SHARC is merely an upstream process with a much larger population participation.

Fig. 7-6 overview SHARC procedure

source: own editing 2015

- **Survey interview**

The interview of experts is the basis for the situation survey in the community. The aim is to keep the questioning of the decision-makers in the communities as short as possible as well as comfortable (see Chapter 6.6). Therefore, the author has set the goal to handle the interview within eight hours. The interview of experts can also be divided into several units by means of a modular structure. With the continuous coding of the questions, an individual arrangement of questions for the improvement of the interview flow is possible, independently of the SHARC database. An individual part of the survey, determined by the expert, can also be written before the interview of experts.

- **Analysis and recommondations for action**

The feedback of the survey interview is collected in the database, supplemented by a rating and then evaluated. Based on this analysis, the development of recommendations for action is carried out. These recommendations together with the results of the survey are then incorporated into the preliminary report.

In the context of SHARC, the analysis of the survey takes place according to various aspects which are explained below:

- The analysis by topic shows the community's commitment within the eight themes. The analysis is carried out on the whole questions according to all topics. The more points are reached by the community, the stronger (the more positive) is the community's commitment to the respective topic. This analysis serves the balance of the political activities, as well as the prevention of unilateral developments.

- The analysis after process steps takes place over the entire questions after all process steps. The more points are reached by the community, the stronger (the more positive) is the community's commitment within the respective process step. The balance between political declarations of intent and actual implementations becomes visible.

- The presentation of the respective strengths or weaknesses of a community in the eight topics shows the possibilities of positioning as well as the current tasks. This analysis is complemented by an open collection of wishes and challenges. These analyses serve as a basis for communication with the institutions and potential network partners as well as the further development of SHARC.

- The analysis of the degree of the fight against climate change within the community as well as after development dynamics generates knowledge on the attitudes and dynamics of development in the community regarding the on-going global and national changes. The analyses is carried out above all eight topics. The community is then classified according to the subsections of the development dynamics

a) adapting to the challenge or looking away, wait and see, sit out (negation)
b) tackling the causes, defusing the causes (mitigation)
c) increasing the own resilience (resilience)
d) adapting to the change (adaptation)
e) own transformation (transformation).

- The foundation for the success of a community on the path of sustainable development is the communication activity of the community with the citizens. In addition, an analysis is carried out according to the degree of commitment of the community towards its own goals and plans. The analysis takes place through the governance-oriented capacity to act and implementations (structures, decisions, etc.) in all eight topics.

- In the context of the research focus "global change – regional sustainability", an analyses of the safety aspects in the remaining seven topics is carried out in addition to the analyses in the topic of security. Since the tool does not respond to all eventualities of communities in the sense of a lean tool, there is a possibility of not answering questions - if they are well founded. These are presented bundled and also serve the further development of the tool. In addition other specific aspects can be analysed and presented at the request of the community or other institution.

The results of the various analyses are compared with the best possible results as well as with other communities analysed by SHARC. In particular, the deviations are analysed and commented. For the weaknesses or development potentials, recommendations for action are developed. Reference is made to those criteria which have the greatest possible score potential within a topic. About three recommendations for action are formulated for each topic and for the overall situation. As a result, around 25-30 recommendations for action are pronounced for the community.

- **Interim meeting/ preliminary report**

The results of the analysis as well as the developed recommendations for action will be presented and discussed in form of a preliminary report with the decision-makers involved in the interview of experts. This serves on the one hand to inform them about the interim result and to uncover possible misunderstandings. On the other hand, the interim presentation also serves to obtain the approval and support of the decision-makers in order to initiate contact with the citizens via invitation through community.

This form of controlled dissemination of information to citizens as well as the late involvement of citizens is to be questioned from the perspective of sustainable development and the intended participation of citizens. However, this limitation seems to be justifiable by the author in order to even enable the citizen involvement.

- **Citizens involvement**

The SHARC results will ultimately be passed on to the citizens through decision-makers in order to work out the results in various participation models. A final report including measures recommendations and implementation plan will only be drawn up after the results of this participatory phase have been taken into account. Participation is a very important element of sustainable development and is also in line with the current political requirements for community development in Vorarlberg.[1]

As part of the development of SHARC and based on the theoretical considerations in Chapter 2.3. Participation, five different models of citizen involvement are considered:

- SHARC-information

The citizens of the community are informed about the SHARC results by means of an information booklet.

- SHARC-fokus

Public evening event with the presentation of the SHARC results as well as further deepening of three themes selected by the citizens.

- SHARC-action day

All community citizens are invited to develop ideas, suggestions and participation projects based on the SHARC results in a special framework.

- SHARC-citizens council

12-16 community citizens draw up in one and a half days a plan of action and implementation of the SHARC recommendations for action.

- SHARC-Bürger-Check

A group of about 10 community citizens reviews plans and important projects on their impact on the SHARC topics and the SHARC overall result.

The community determines which citizen participation modules are applied. The whole concept of participation is based on the so-called modular principle and can be individually assembled and combined.

- **Final report**

The final report is an adaptation of the preliminary report and brings together the results of the survey interviews, the analysis and recommendations for action of the interim meeting and the citizen involvement. The final report can act as a development guideline for the sustainable development of the community. The measures and recommendations for implementation are intended to trigger next projects and steps in the community.

The final report has a designed standard and shows the main strengths and development potential of the community as a whole as well as in the individual eight topics. Furthermore, the status of development processes, the commitment of politics and the annual surveys of the community are reflected. Based on this, the exemplary effect of the community, as well as the communication of the community with its citizens and with its local network partners is analyzed.

The final report will be delivered to decision-makers. A resolution on the results, e.g. analogous to the planning scheme or the regional development concept, is not intended. For the discussion of the results also among the members of the political opposition, the presentation of the SHARC results in front of the municipal council is foreseen.

[1] This becomes particularly visible in the funding guidelines of Vorarlberg, if citizens' participation is a precondition for an approval of funding, e.g. play and open space concept. (cf. provincial government of Vorarlberg, Dept. Spatial Planning, 2015c)

- **Implementation within CESBA Alps**

The application of the SHARC check can be carried out as part of the project CESBA Alps, as forerun to the assessment. SHARC delivers an overview of the challenges of territorial development. In the course of the assessment, these topics can be discussed separately.

The application of SHARC in the framework of CESBA Alps takes place in 5 steps:

1. Translation of the SHARC tool into the respective national language as well as adaptation of the local framework conditions and terminology
2. Training of users of SHARC by the developer Markus Berchtold-Domig
3. Application of SHARC in the communities
4. Alignment of the results with Markus Berchtold-Domig as well as with the other participating communities
5. Generation of reports for the communities and generation of a general report for the project CESBA Alps.