








CIVITAS indicators

Urban liveability index (TRA_US_EL1)

DOMAIN

 <p>Transport</p>	 <p>Environment</p>	 <p>Energy</p>	 <p>Society</p>	 <p>Economy</p>
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TOPIC

Urban space

IMPACT

Urban environment liveability

Improving the quality of the urban environment

ENV_US

Category

Key indicator	Supplementary indicator	State indicator
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CONTEXT AND RELEVANCE

Context to be drafted

This indicator provides a measure of the liveability of the urban environment in the pilot area, measured according three elements: air quality, noise, visual impact of parked vehicles. **It is a relevant indicator when the policy action is aimed at improving the environmental liveability of the pilot area, reducing negative implications of urban transport. A successful action is reflected in a HIGHER value of the indicator.**

DESCRIPTION

This indicator is a **dimensionless** index obtained as combination of other indicators, namely:

- **Share of zero or low emissions technologies on road vehicles**
- **Noise in a sample of roads and periods**
- **Share of vehicles irregularly parked or Share of urban surface dedicated to vehicle parking**

The rationale is that improving one or more of these dimensions of the urban transport system means providing citizens with better alternatives to private car.

This indicator measures the **modification of liveability provided by the experiment** rather than the liveability in absolute term. It is therefore **a meaningful indicator when comparing the after-experiment case to the BAU case** (or to the before-experiment case) while **it is NOT a meaningful indicator to measure the urban liveability level in one specific condition or when comparing different experiment sites.**

METHOD OF CALCULATION AND INPUTS

The indicator is calculated by means of a mathematical equation, **within the supporting tool, building on a set of required inputs.**

Method		
Calculation of the index based on other indicators	Significance: 0.50	
METHOD OF CALCULATION		

The indicator is computed **within the supporting tool** according to the following steps:

- **Calculation of other indicators for the before-experiment case.** For the method of calculation of the required indicators (see inputs below), make reference to the dedicated indicator templates.
- **Calculation of other indicators for the BAU case.** For the method of calculation of the required indicators (see inputs below), make reference to the dedicated indicator templates.
- **Calculation of other indicators for the after-experiment case.** For the method of calculation of the required indicators (see inputs below), make reference to the dedicated indicator templates.
- **Calculation of the change of indicators** in the after-experiment case relative to the before-experiment case and relative to the BAU case.
- **Estimation of the index.**

INPUTS

The following information should exist in the supporting tool to compute the indicator. Note that when it is chosen to compute the indicators mentioned below, their values are found directly within the supporting tool. Therefore, **there is no need to code them manually**. If some of the indicators mentioned below are not available, this indicator cannot be computed.

- a) **ENV_PL_PFn.** Value of the **Indicator of the share of zero or low emissions technologies on road vehicles** in the before-experiment case, in the BAU case and in the after-experiment case. Within the ENV_PL domain there are two alternatives for this indicator.
- b) **ENV_NS_NE1.** Value of the **Indicator of noise in a sample of roads and periods** in the before-experiment case, in the BAU case and in the after-experiment case.
- c) **ENV_US_IPn.** Value of the **Indicator of Share of vehicles irregularly parked or of the share of urban surface dedicated to vehicle parking** in the before-experiment case, in the BAU case and in the after-experiment case. The two indicators are alternative within the ENV_US domain.

The experiment would be reflected in the modification of one or more of these indicators as result of one or more interventions affecting the features of the urban transport system measured by each indicator.

EQUATIONS

The equations used **within the supporting tool** to manage the calculation, building on the needed inputs, are the following:

Calculation of the relative change of the indicator in the after-experiment case relative to the before-experiment case, for those indicators *I* reflecting a successful action by means of a LOWER value (**ENV_NS_NE1** and **ENV_US_IPn**).

$$I_{AEBEChng} = \frac{I[BE]}{I[AE]}$$

Where:

$I[BE]$ = Value of the indicator I in the before-experiment case

$I[AE]$ = Value of the indicator I in the after-experiment case

For instance:

$$<ENV_NS_NE1>AEBEChng = \frac{ENV_NS_NE1[BE]}{ENV_NS_NE1[AE]}$$

Calculation of the relative change of the indicator in the after-experiment case relative to the before-experiment case, for those indicators I reflecting a successful action by means of a HIGHER value (**ENV_PL_PFn**):

$${}^I AEBEChng = \frac{I[AE]}{I[BE]}$$

Calculation of the relative change of the indicator in the after-experiment case relative to the BAU case, for those indicators I reflecting a successful action by means of a LOWER value:

$${}^I AEBAUChng = \frac{I[BAU]}{I[AE]}$$

Calculation of the relative change of the indicator in the after-experiment case relative to the BAU case, for those indicators I reflecting a successful action by means of a HIGHER value:

$${}^I AEBAUChng = \frac{I[AE]}{I[BAU]}$$

Estimation of the urban environment liveability (indicator value) with respect to the BAU and with respect to the before-experiment case:

$$CarDepIndex = \sum_I ({}^I AEBAUChng * {}^I UrbLivWhgt)$$

$$CarDepIndex = \sum_I ({}^I AEBEChng * {}^I UrbLivWhgt)$$

Where:

${}^I UrbLivWhgt$ = Weighting factor associated to the indicator I .

The weighting factors are **predefined within the supporting tool** as follows:

$$<ENV_PL_PFn>AEBAUChng = 0.35$$

$$<ENV_NS_NE1>AEBAUChng = 0.40$$

$$<ENV_US_IPn>AEBAUChng = 0.25$$

ALTERNATIVE INDICATORS

This indicator is a combination of other indicators providing objective measures of some specific dimensions. If computing these other indicators is already envisaged as part of the assessment, it is straightforward computing this indicator. If the calculation of the other indicators is not envisaged, the indicator described in this factsheet requires some work. Furthermore, this indicator covers only three dimensions, which are not necessarily exhaustive of what contributes to environmental liveability. Therefore, even if it is based on objective measures, its level of significance is not so high.

In alternative to the indicator described in this factsheet, the indicator ENV_US_PL1 can be considered. This alternative indicator measures the perceived environmental liveability, i.e., a qualitative and subjective evaluation, rather than on an objective measure. From this point of view, it can be considered less significant than the indicator described in this factsheet. Notwithstanding, judgments about the perceived liveability can implicitly consider a wider range of elements than the three variables considered in the indicator described in this factsheet. Also, the estimation of the alternative indicator can be of limited complexity if a sample survey in the pilot area is already envisaged to collect information needed for other indicators.

