CIVITAS indicators

Observed irregular parking (ENV_US_IP1)

DOMAIN

Transport	Environment	Energy	Society	Economy

TOPIC	**Noise**	
IMPACT	**Transport noise emissions** *Reducing the level of noise generated by transport*	**ENV_NS**

Category

Key indicator	Supplementary indicator	State indicator

CONTEXT AND RELEVANCE

<mark>To be drafted</mark>.

Irregular parking can create problems to the circulation of vehicles and pedestrians. Even when these problems are not generated, irregular parking contributes to poor quality of the urban space, which is overwhelmingly used by vehicles. This indicator provides a measure of the irregular parking in the pilot area. **It is a relevant indicator when the policy action is aimed at reducing the urban space irregularly occupied by non-operating vehicles. A successful action is reflected in a <u>LOWER</u> value of the indicator.**

DESCRIPTION

The indicator is computed on the number of vehicles regularly and irregularly parked in a sample of locations in the pilot area.

The indicator is eventually in form of a share; therefore, it is **dimensionless**.

METHOD OF CALCULATION AND INPUTS

The indicator is computed within the supporting tool, by applying one of the two methods described, building on the required inputs.

There are two alternative methods of calculation available for this indicator. The two methods distinguish for the number of locations and periods when the number of parked vehicles is registered and for either considering or not different vehicles types and location types. One method is simpler, but therefore provides less significant results; the other method is more complex and therefore provides more significant results.

METHOD 1	METHOD 2
Number of parked cars registered in a smaller number of locations and periods	**Number of parked vehicles registered in a larger number of locations and periods**

Complexity	▮▮▯▯	Complexity	▮▮▮▯
Significance	▮▮▯▯	Significance	▮▮▮▯

Method 1

Number of parked cars registered in some locations in one period of one sample day	Significance: **0.50**

INPUTS

The following information is needed to compute the indicator:

a) **The number of <u>regularly</u> parked cars by location type in a sample of locations of the pilot area**.

b) **The number of <u>irregularly</u> parked cars by location type in a sample of locations of the pilot area**.

   According to this method, the registrations of regularly and irregularly parked cars should be made:

   - **In at least 10 locations**. Locations should be selected among places of the pilot area where irregular parking of cars is an issue in the reference conditions (i.e., before the pilot is started) as well as places (even outside the pilot area) where irregular parking might become an issue after the pilot (e.g. limiting access to some roads might cause the relocation of parked cars in neighbouring streets). The selected locations should include roadsides, platforms, squares, flowerbeds, etc.; i.e., any open public place where cars can be parked irregularly.
   - **In 1 sample day**. The sample day should not necessarily be the same for all locations. Namely, if in some locations irregular parking is a problem in non-working days rather than in working days, they should be inspected in a non-working day.
   - **In 1 period of the day**. 1 period means that just one inspection is made in the sampled day. The inspection can be made in different periods in different locations, but the period should be anyway a significant one. For instance, if in one location the irregular parking is an issue in late afternoon or evening, the inspection should be made in late afternoon or evening.

   The inputs to be coded in the supporting tool are the total number of cars regularly parked and the total number of cars irregularly parked summing over all locations.

The experiment would result in a modification of the registered number of irregularly parked cars in the same locations and in equivalent periods.

METHOD OF CALCULATION

Using Method 1, the indicator is computed **within the supporting tool** according to the following steps:

- **Calculation of the total number of parked cars in all locations** (see equation below).

- **Calculation of the indicator** as ratio between the total number of irregularly parked cars and the total number of parked cars (see equation below)

EQUATIONS

The indicator is computed, within the supporting tool, **as**:

$$IrregParkShr = \frac{TotIrregParkVeh}{TotRegParkVeh + TotIrregParkVeh}$$

Where:

$TotIrregParkVeh$ = Total registered number of cars irregularly parked in the locations monitored.

$TotRegParkVeh$ = Total registered number of cars regularly parked in the locations monitored.

Number of parked vehicles registered in several locations in two periods of three sample days	Significance: **0.75**

INPUTS

The following information is needed to compute the indicator according to Method 2:

c) **The number of <u>regularly</u> parked vehicles by vehicle type and place type in a sample of locations of the pilot area**.

d) **The number of <u>irregularly</u> parked vehicles by vehicle type and place type in a sample of locations of the pilot area**.

According to this method, the registrations of regularly and irregularly parked vehicles should be made:

- **In at least 20 locations**. Locations should be selected among places of the pilot area where irregular parking of some type of vehicles is an issue in the reference conditions (i.e., before the pilot is started) as well as places (even outside the pilot area) where irregular parking might become an issue after the pilot (e.g. limiting access to some roads might cause the relocation of parked cars in neighbouring streets). The selected locations should include roadsides, platforms, squares, flowerbeds, etc.; i.e., any open public place where some kind of vehicles (including bicycles and scooters) can be parked irregularly.

- **In 3 sample days (for each location)**. The sample days should not necessarily be the same for all locations. Namely, if in some locations irregular parking is a problem in non-working days rather than in working days, they should be inspected in 3 different non-working days.

- **In 2 periods of the day (for each location)**. 2 periods means that in the sampled day the inspection to collect the number of parked vehicles is repeated twice. The 2 periods can be different in different locations. For a given location, the second period should not be scheduled earlier than 3 hours after the first period.

The number of regularly and irregularly parked vehicles should be registered in each period and day, separately by vehicle type and by place type, according to the following template.

	Place type			
Vehicle type	*Roadside*	*Reserved lanes (PT, bike)*	*Pedestrian / wheelchairs paths*	*Close to traffic*
Light commercial vehicles				
Cars				
Motorbikes				
Bicycles				
Scooters				

There cannot be regularly parked vehicles on reserved lanes or pedestrian/ wheelchairs paths. Irregular parking of large trucks or buses is not part of the exercise.

The input to be coded in the supporting tool should be the sum of vehicles registered over all periods and days for a specific vehicle type and place type.
For instance, if the number of cars irregularly parked roadside is registered as:
Day 1 – period 1: 7
Day 1 – period 2: 4
Day 2 – period 1: 5
Day 2 – period 2: 5
Day 3 – period 1: 3
Day 3 – period 2: 8
The input for the supporting tool **related to cars and to roadside** should be the total registered number of cars irregularly parked roadside: 7 + 4 + 5 + 5 + 3 + 8 = 32.
Analogous input should be provided for the other vehicle type and place types.

The experiment would result in a modification of the registered number of irregularly parked vehicles in the same locations and in equivalent periods.

METHOD OF CALCULATION

Using Method 2, the indicator is computed **within the supporting tool** according to the following steps:

- **Calculation of the weighted number of parked vehicles by vehicle type and place type** (see equation below). Weights are applied to consider that the impact on the liveability of the urban environment of irregularly parked vehicles differs according to the vehicle type and the location type. For instance, a scooter left in the middle of a pedestrian square is not comparable to a car parked on a bike-reserved lane. The weights applied, pre-defined in the supporting tool, are shown in the following table. See equation below for the application of the weights.

Vehicle type	Place type			
	Roadside	Reserved lanes (PT, bike)	Pedestrian / wheelchairs paths	Close to traffic
Light commercial vehicles	1	2	2	1
Cars	1	1.5	1.5	1
Motorbikes	0.75	1.5	1.5	0.75
Bicycles	0.5	1	0.75	0.5
Scooters	0.5	1	0.5	0.5

- **Calculation of the total weighted number of parked vehicles for all place types and vehicle types** (see equation below).

- **Calculation of the indicator** as ratio between the total weighted number of irregularly parked vehicles and the total weighted number of irregularly and regularly parked vehicles (see equation below)

The weighted number of parked vehicles by vehicle type and place type is computed, **within the supporting tool,** as**:**

$$WRegParkVeh_v^s = RegParkVeh_v^s * Parkwght_v^s$$

$$WIrregParkVeh_v^s = IrregParkVeh_v^s * Parkwght_v^s$$

Where:

$RegParkVeh_v^s$ = Total (over all days and periods) registered number of vehicle type v regularly parked in place type s.

$RegParkVeh_v^s$ = Total (over all days and periods) registered number of vehicle type v irregularly parked in place type s.

$Parkwght_v^s$ = weight associated to vehicle type v parked in place type s.

The total number of weighted parked vehicles for all place types and vehicle types is computed, **within the supporting tool,** as**:**

$$TotWRegParkVeh = \sum_s \sum_v WRegParkVeh_v^s$$

$$TotWIrregParkVeh = \sum_s \sum_v WIrregParkVeh_v^s$$

The indicator is finally computed, **within the supporting tool,** as**:**

$$IrregParkShr = \frac{TotWIrregParkVeh}{TotWRegParkVeh + TotWIrregParkVeh}$$

ALTERNATIVE INDICATORS

This indicator is based on observed regular and irregular parking in sample of locations. Irregular parking is one dimension of misuse of urban space, as irregularly parked vehicles (especially cars) invade space that should be diversely used and can easily have a negative visual impact. At the same time, these adverse consequences of parking are not necessarily limited to irregularities. Many parked vehicles in an area can be considered an undesired use of urban space even if all vehicles are parked regularly. Therefore, it should be considered that this indicator covers only one part of the questionable use of urban space. In relation to this part, being based on observed elements, it is significant, especially if Method 2 is used. At the same time, organising an on-field inspection to identify irregularly parked vehicles is somewhat complex, especially under the requirements of Method 2.

An alternative indicator is ENV_US_PI2, which is based on the surface dedicated to parking vehicles (irrespectively whether regularly or irregularly) in the pilot area. This indicator has a different focus than the one described in this factsheet. On the one hand the focus of the alternative indicator is broader, as it is not limited to irregular parking. On the other hand, the focus could be less precise, because the simpler method to compute the alternative indicator is based on the inspection of GIS maps, where spaces used for parking vehicles irregularly can be identified only approximatively. The

alternative method, if based on the inspection of GIS maps is therefore less relevant the one described in this factsheet even if its computation is comparatively less complex.