



## Green mobility data models and services for smart ecosystems

### List of Key Performance Indicators (KPIs) to measure the impact of GreenMov

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## List of Acronyms

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Abbreviation / acronym	Description
CEF	Connected Europe Facilities
KPI	Key Performance Indicator
AQI	Air Quality Index
OSLO	Open Standards for Local Administrations

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## Executive Summary

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Performance and management indicators are needed to measure what is happening, which is the deviation with regards to the original plan and what to do in order to reach the target. They are used as a valuable supporting tool for assessing the situation and taking the right decisions and choices. Usually, they are called Key Performance Indicators (KPIs). In the document, we will use simply “indicators”.

For the purposes of GreenMov, several types of indicators will provide as assessment of the impact of the project. First, the indicators to measure the benefit of GreenMov for the three cities and regions involved in the project. Second, the indicators to assess the contributions available for the community. And finally, the indicators which will help us to measure the impact of the project in the research community and the level of awareness of our work.

From these three angles, the purpose of this deliverable is to list and explain all the indicators in the three categories, identify their targets and current values. These indicators will be monitored during the overall project and measures will be taken every six months, so all the updates will be provided in Activity 1 reports.

A total of **24 indicators** have been identified, 8 about impact in cities/regions, 8 about technical contributions to the community and 8 about project awareness by the research community.

The indicators in this document have been collected from all the project activities, the three pilots and have been reviewed and approved by all the partners.

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# 1 Introduction

## 1.1 Purpose of the document

The purpose of this document is to provide the full list of indicators which have been collected across all activities in the project. The purpose of these indicators will be to measure the impact of GreenMov project in:

- Reducing the emissions and improving the mobility in the cities and regions participating in the project.
- Providing valuable contributions to the research community.
- Reaching the maximum awareness in the research community.

The indicators will be measurable, will define a target value, a baseline value (at M6 when this deliverable is being produced) and will be continuously monitored (at M12, M18 and M24), providing a final achieved value for assessment of the impact.

## 1.2 Relation to other project work

The indicators have been collected from use cases in Activity 5, from technical work in Activities 2, 3 and 4; and from dissemination and communication plans from Activity 6. Collaboration indicators are coming from Activity 1.

## 1.3 Structure of the document

This document is structured in 5 major chapters (including this for introduction).

**Chapter 2** presents the indicators for the cities and regions in the project.

**Chapter 3** presents the indicators which will assess the technical contributions of GreenMov to the community.

**Chapter 4** presents the indicators about GreenMov awareness and relevance for the research community (including other CEF projects).

Finally, **Chapter 5** presents the conclusions of the document.

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## 2 Measuring impact in the cities/regions

This section includes the indicators that have been identified by pilots in the project to assess the value of the use cases that they will implement by using the data models specified in Activity 2, the services developed in Activity 3 and the federated architectures recommended from Activity 4.

According to the type of data and scenarios that each pilot has described in the deliverable D5.1[1], the involved cities and regions have defined the list of indicators below. Behind these indicators, every city or region has its own high level targets in terms of pollution reduction and traffic improvement included in their city strategies. The indicators listed below will contribute somehow to the achievement of those high level objectives at some extent.

### 2.1 List of KPIs

Eight indicators have been identified by the three use cases in the project: one by Flanders region, three from Murcia/Molina Del Segura and four from Nice metropole. The selected indicators are quite in line with the green mobility services that they are planning for their pilots to be developed in the context of Activity 3. The indicators will measure in most of the cases the accuracy of the forecasting models they will put in place for bicycles, air quality and noise. Others are related to the number of provided recommendations about the traffic to the city or the percentage of traffic that will be considered by the pilot.

**Table 1: KPIs about impact in project use cases.**

KPI label	KPI description	Target value	Baseline value (M6)
BlueBike Availability Prediction Accuracy	Compare predicted number of bikes at arrival $t + 30$ min with real number.	75%	N/A
Murcia Air Quality Measurement accuracy	Measures the accuracy of a measurement from GreenMov low cost sensors conforms to the correct value from a reference device.	1,5	N/A
Bike availability forecasting Dispersion Coefficient R2	Measurement of bikes availability forecast accuracy. The coefficient determines the quality of the model to replicate the results, and the proportion of variation in the results that can be explained by the model.	80%	N/A
Bike availability forecasting mean Absolute Error	Measurement of bikes availability forecast accuracy. It is a measure of the difference between two continuous variables, in concrete the predicted bike's availability and the real bike's availability.	75% or 6 bikes	N/A
Nice AQI forecast model accuracy	Accuracy of the AQI forecasting model.	75%	N/A

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Nice Daily recommendation number	Refers to the number of recommendations per day provided by the service implemented in the Nice use case, based on the traffic density and air quality assessment. A recommendation can either be a short term recommendation to change transportation for public transport, or to not change anything.	2	N/A
% of the city's traffic addressed	Refers to the percentage of the city's traffic addressed by the implemented solution.	50%	N/A
Noise annoyance forecast model accuracy	Accuracy of the noise annoyance forecasting model by comparing the real noise vs. forecasted noise, evaluated using Euclidean norm.	75%	N/A

## 2.2 Assessment

At the time of this report in M6, the use cases have not yet the chance to measure any of the indicators, thus the column with the baseline value is not provided, since the models are not still available to take measurements. The first assessment of the KPIs will take place by M12 and will be included in the monitoring reporting due by that time.

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## 3 Measuring technical contributions to the research community

The purpose of the indicators in this section is to measure the level of contribution that GreenMov will have in the research community. The technical KPIs have been provided from the Activities 2, 3 and 4.

### 3.1 List of KPIs

Eight indicators have been identified in this category. Some of them were already identified at the proposal time, and others have been added now after preliminary work in all the technical activities. In some cases, the KPIs rely on the requirements from the use cases.

**Table 2: KPIs about contributions to the research community.**

KPI label	KPI description	Target value	Baseline value (M6)
#green_mobility_services	Number of green mobility services provided under open source license in FIWARE Marketplace.	at least 3	0
#smart_data_models_contributed	Number of contributions (new data models or updates to existing) to the Smart Data Models repository.	at least 10	11
#OSLO_contributions	Contributions to OSLO standard.	1	0
#shared_datamodels	Number of data models shared by more than one city.	2 or more	5
#shared_services	Number of services shared by more than one city.	3 or more	2
Source selection performance	Time to identify relevant context broker based on data in the request from the service supporting the use case.	< 1 sec	N/A
Standardized platform scalability	Minimum level of messages for standard platform (4 V CPU, 16 GB RAM).	Determined by the use cases	$\geq 100$ / sec
Stability	Period of constant performance.	Determined by the use cases	> 1 month

### 3.2 Assessment

Despite the short life of the project, some KPIs are taking a good shaping. For example:

- smart data models contributions have been already overpassed;

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- already five data models have been shared by at least two cities;
- two services are already shared by two use cases (Flanders and Murcia/Molina);

In other cases, the KPI has not still started and baseline value is 0.

For some of the technical KPIs, the baseline value has not been able to produce yet, so they cannot be assessed in this moment. There are two technical KPIs which target value will be determined by the use cases, as it will depend on how much real time data they will produce, which unknown for now.

A new assessment will take place at M12 and will be included in the next monitoring report.

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## 4 Measuring impact in research community

The purpose of the indicators in this section is to measure the level of awareness that GreenMov will have in the research community. The dissemination and communication KPIs are collected by the Activity 6 in the deliverable D6.1[2]. The KPI about number of collaboration activities will be managed from the Activity 1, where collaboration task is allocated.

### 4.1 List of KPIs

Eight indicators are measuring the level so awareness and engagement of the research ecosystem related to GreenMov. As CEF project, the natural research ecosystem for GreenMov is the CEF program and concretely the Public Open Data projects. This ecosystem is enlarged with the FIWARE community, smart cities initiatives, mobility forums, decarbonization initiatives and data management research topics in general. The full picture of GreenMov ecosystem can be consulted in D6.1[2].

The list below shows indicators which measure the presence in social networks, in Internet in general, in press, in events and conferences. Collaboration with other CEF projects is also monitored.

**Table 3: KPIs about impact in research community.**

KPI label	KPI description	Target value	Baseline value (M6)
Media coverage targets	Number of press cut in national media.	10	2
Social media targets	Number of genuine Twitter followers.	200	19
LinkedIn targets	LinkedIn followers.	200	116
Website rates	Site bounce rates (in loads).	3000	258
Event-related targets	Number and type of participants.	120	50
Publications	Number of general and peer-reviewed scientific publications.	2	0
Blog posts	Number of blog posts about project matters.	20	0
#CEF_collaborations	Number of collaborations with other CEF projects.	at least 3	1

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## 4.2 Assessment

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Despite the short life of the project, some KPIs are taking a good shaping. For example:

- there is already and established collaboration with ODALA project;
- the number of followers in LinkedIn is at 60% of the final target;

In other cases, the KPI has not still started and baseline value is 0.

A new assessment will take place at M12 and will be included in the next monitoring report.

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## 5 Conclusions

GreenMov as defined 24 Key Performance Indicators to measure and monitor the progress of the project and its impact in the final users and in the research community. The selected indicators are from different nature, according to the type of impact they will measure.

Eight indicators will measure the impact of GreenMov in the cities and regions piloted in the project

Eight indicators will measure the technical relevance of the GreenMov outcomes for the research community.

And other eight indicators will measure the level of awareness and engagement that GreenMov will reach in the related ecosystem.

For each indicator, this deliverable provides a description, a target value with the ambition at the end of the project and a baseline value taken at M6 of this deliverable to register the starting point which with compare in future assessments.

The indicators will be continuously monitored and new assessments will be reported at M12, M18 and M24.

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## 6 References

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- [1] **Deliverable:** GreenMov, D5.1 Requirements for data sets and mobility services, Benoit Couraud (IMREDD), 2022
- [2] **Deliverable:** GreenMov, D6.1 Impact and Communication Strategy, Nacho Gonzalez (ATOS), 2022

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