



Green mobility data models and services for smart ecosystems

D6.4 GreenMov Final Workshop

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Document name:	D6.4 GreenMov Final Workshop				Page:	2 of 31	
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status:	Final

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Document name:	D6.4 GreenMov Final Workshop				Page:	3 of 31	
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status:	Final

Table of Contents

Document Information	2
Table of Contents	4
List of Figures	6
List of Acronyms	7
Executive Summary.....	8
1 Introduction.....	9
1.1 Purpose of the document.....	9
1.2 Relation to other project work.....	9
1.3 Structure of the document	9
2 Workshop Objectives.....	11
3 Workshop summary	12
3.1 Summary Card	12
3.1.1 Date and Venue.....	12
3.1.2 Workshop structure.....	12
3.1.3 Workshop promotion	13
3.2 FIWARE summit	14
3.3 Agenda	15
3.4 Attendance	16
4 Workshop Presentations.....	19
4.1 Semantic challenges in Open data: The role of Interoperable Europe	19
4.2 From raw data to smart mobility services for citizens	20
4.3 Flanders Smart Data Space: Building linked data ecosystems.	23
4.4 Collaborative, Secure and Replicable Open Source ‘Data Lakes’ for Cities	25
4.5 Enabling interoperability for Linked Open Statistical Data.....	26
5 Workshop Feedback.....	28
5.1 Questions and Answers.....	28
5.2 Stakeholders Personal Opinion	28
5.3 Some publications after the meeting	29

Document name:	D6.4 GreenMov Final Workshop				Page:	4 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

5.3.1 On the Web of the projects: 29

5.3.2 On YouTube..... 29

6 Conclusion..... 30

7 References 31

Document name:	D6.4 GreenMov Final Workshop				Page:	5 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

List of Figures

<i>Figure 1 GreenMov PERT Chart</i>	9
<i>Figure 2 Workshop Participants. Source: FIWARE Foundation</i>	12
<i>Figure 3 Dedicated banner for promotion</i>	13
<i>Figure 4 Promotion of The Closing Event of the Connecting Europe Facility (CEF) Projects Twitter.</i>	14
<i>Figure 5 Announcement of the Open Data Cluster Closing Event</i>	15
<i>Figure 6 Attendees during the event. Source: GreenMov consortium.</i>	18
<i>Figure 7 Agenda of the slot: "Semantic challenges in Open data: The role of Interoperable Europe "</i>	19
<i>Figure 8 Agenda of the slot: "From raw data to smart mobility services for citizens"</i>	20
<i>Figure 9 Annelies De Craene (Digital Flanders), presented Flanders Smart Data Space. Source: GreenMov consortium.</i>	23
<i>Figure 10 ODALA Project agenda. Source: ODALA Project.</i>	25

Document name:	D6.4 GreenMov Final Workshop				Page:	6 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

List of Acronyms

Abbreviation / acronym	Description
API	Application Programming Interface
CEF	Connecting Europe Facility
EC	European Commission
LDES	Linked Data Event Stream
LODS	Linked Open Statistical Data
NGSI	Next Generation Service Interfaces
OSLO	Open Standards for Linked Organisations
SDMX	Statistical Data and Metadata Exchange

Document name:	D6.4 GreenMov Final Workshop				Page:	7 of 31	
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status:	Final

Executive Summary

This report provides a comprehensive overview of the workshop held during the FIWARE summit 9th edition of the FIWARE Global Summit held in Vienna on 12-13 June 2023. The workshop was organized co-jointly by the FIWARE Foundation and the CEF projects GreenMov, ODALA, and INTERSTAT.

The report is structured into six distinct chapters, each delving into essential information of the event.

Chapter 1 provides an overview of the objectives and scope of the workshop report and additional insight into how the workshop aligns with the broader project context, **Chapter 2** gives a description of the primary goals and aspirations behind the organization of the project, **Chapter 3** presents a concise overview of key workshop details, including dates, venue, structure, and promotional aspects and an exploration of the FIWARE summit within the context of the workshop, **Chapter 4** provides detailed summaries of notable presentations delivered during the workshop, covering subjects like semantic challenges in open data, smart mobility services, linked data ecosystems, open-source 'data lakes,' and interoperability for linked open statistical data, **Chapter 5** provides an overview of the GreenMov interactive sessions involving questions and discussions and gathers perspectives from various stakeholders on the workshop's content and outcomes and to finalize **chapter 6** presents the conclusions of the workshop.

Note: It is worth highlighted that the presentations described in this report were owned by:

- Semantic challenges in Open data: The role of Interoperable Europe, author European Commission
- Flanders Smart Data Space: Building linked data ecosystems author Digital Flanders
- Collaborative, Secure and Replicable Open Source 'Data Lakes' for Cities owner ODALA
- Enabling interoperability for Linked Open Statistical Data author INTERSTAT project.

It is not the goal of this document claim the ownership of the above presentation, only describing their content and message.

Document name:	D6.4 GreenMov Final Workshop				Page:	8 of 31	
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status:	Final

1 Introduction

1.1 Purpose of the document

GreenMov held its Final Event in the framework of the 9th edition of the FIWARE Summit held in Vienna on 12-13 June 2023.

The purpose of the final workshop of the CEF (Connecting Europe Facility) project GreenMov is to culminate the project's activities by bringing together key stakeholders, partners, and participants. This workshop serves as a platform to present and disseminate the project's outcomes, achievements, and lessons learned throughout its implementation. Additionally, it aims to gather valuable feedback and insights from attendees, fostering knowledge exchange and promoting further collaboration among relevant stakeholders. The current document summarizes the outputs of this workshop.

1.2 Relation to other project work

Business and social impact are core aspects of the GreenMov project as the fundamental concept of GreenMov was conceived around them.

Activity 6 “Impact generation and business development” is a horizontal activity as it supports the other activities providing a wider knowledge about the external factors affecting the project and analysing the business opportunities of the assets/results developed in other activities such as Activity 2 “Smart Data Models for green mobility”, Activity 3 “Smart services for green mobility”, Activity 4 “Architecture for Context Broker enhancement in concurrent data intensive scenarios as Mobility”.

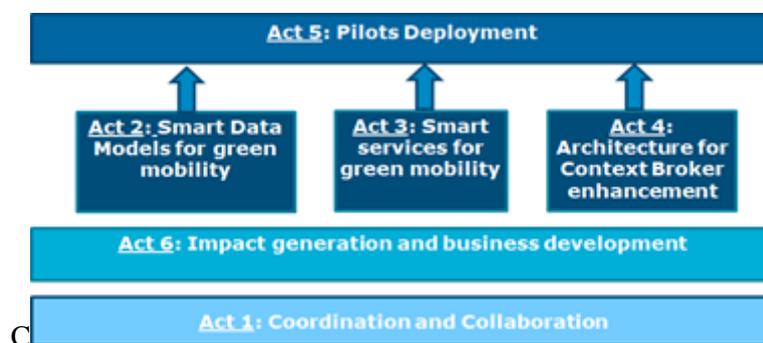


Figure 1 GreenMov PERT Chart

Under task T6.1 Communication and Awareness Raising, the GreenMov Final Workshop was organised. The workshop was organized to gather the main stakeholders in the domain of the Action, and present the results achieved to ensure the future sustainability of the outcomes.

1.3 Structure of the document

This document is structured in 6 major chapters:

Chapter 2 presents the main objectives of the workshop.

Chapter 3 presents a comprehensive summary of the workshop with relevance information.

Document name:	D6.4 GreenMov Final Workshop				Page:	9 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

Chapter 4 describes the presentations provided in each slot.

Chapter 5 summarizes the workshop feedback provided by the participants in the workshop.

Chapter 6 present the conclusion of the event.

Document name:	D6.4 GreenMov Final Workshop				Page:	10 of 31	
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status:	Final

2 Workshop Objectives

The objectives of the Final event are as follows:

- Presenting Results and Technical Guidelines,
- Reflecting on Lessons Learned and Best Practices,
- Analyzing Future Impact for Public Administrations,
- Testing the Value of GreenMov and its sibling projects ODALA, and INTERSTAT,
- Promoting Sustainable and Intelligent Mobility Solutions,
- Reinforce the FIWARE ecosystem,
- Gathering Perspectives and Best Practices.

Overall, the workshop aimed to foster collaboration, knowledge-sharing, and the dissemination of successful practices among stakeholders involved in smart mobility and related CEF projects, ultimately contributing to the advancement and adoption of sustainable and innovative mobility solutions across Europe.

Document name:	D6.4 GreenMov Final Workshop				Page:	11 of 31	
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status:	Final

3 Workshop summary

3.1 Summary Card

3.1.1 Date and Venue

Final Event in the framework of the 9th edition of the FIWARE Global Summit held in Vienna on 12-13 June 2023.



Figure 2 Workshop Participants. Source: FIWARE Foundation

3.1.2 Workshop structure

The workshop was organized co-jointly by the FIWARE Foundation and the CEF projects GreenMov, ODALA, and INTERSTAT.

The event's organization was meticulously orchestrated. This assembly provided an ideal platform for project leaders to effectively present their remarkable outcomes and introduce pioneering solutions that have been cultivated through the initiatives of GreenMov, ODALA, and INTERSTAT.

Commencing the workshop, Pavlina Fragkou, Project Manager at the European Commission, delivered an inaugural presentation that effectively set the stage for a productive exchange of insights, outcomes, and exemplary methodologies. The subsequent proceedings featured presentations from the CEF projects, namely GreenMov, ODALA, and INTERSTAT, interspersed with a contribution by Annelies De Craene from Digital Flanders. This strategic arrangement showcased the interdependencies across the projects and underscored the

Document name:	D6.4 GreenMov Final Workshop				Page:	12 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

practical applicability of the outcomes within Flanders Data Spaces. It is worth noting that Digital Flanders participated as a partner in both GreenMov and ODALA initiatives.

3.1.3 Workshop promotion

FIWARE Foundation was in charge of the promotion of the FIWARE summit, to this end information about the **The Closing Event of the Connecting Europe Facility (CEF) Projects** was included in the promotion Material of the summit.

In order to promote a proper promotional activity, FIWARE with the support of the partners implemented a dedicated promotion on FIWARE's official channels, but not only.

FIWARE communication channels:

- [Website](#) and [event description](#);
- Social Media (e.g. [Linkedin](#))
- [official conference program](#) and [post conference promotion](#).
- dedicated Marketing material (e.g. banner, see below)



Figure 3 Dedicated banner for promotion

To the FWARE Communication, was added massive communication to the more **than 1000 contacts** FIWARE has collected from:

- National Contact Points;
- European Enterprise Networks;
- EU Funding projects and other CEF projects.

Additionally, through the GreenMov project, the workshop was promoted among its main stakeholders. Specifically, GreenMov promoted the workshop on different social networks.

- Twitter,
- LinkedIn,

Document name:	D6.4 GreenMov Final Workshop				Page:	13 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

- Partners internal dissemination channels.

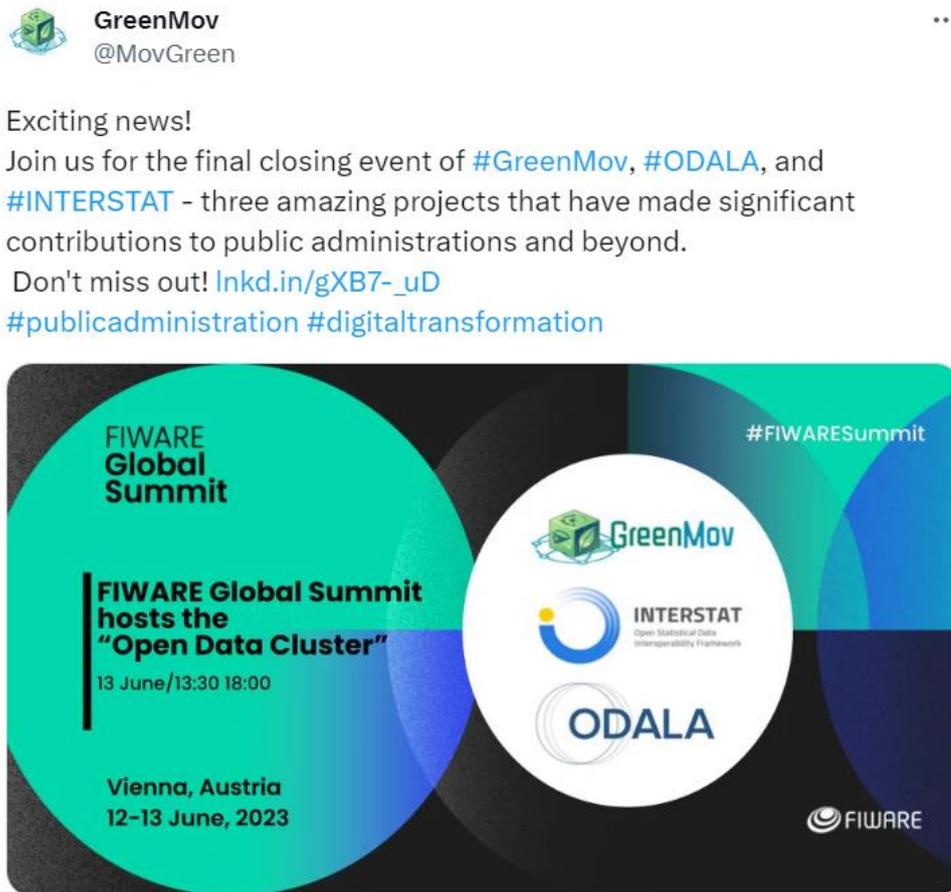


Figure 4 Promotion of The Closing Event of the Connecting Europe Facility (CEF) Projects Twitter.

Last but not least, on 13 June **FIWARE Global Summit** hosted key activities in order to assess the **performance of EU projects** in terms of coordination, technical aspects, reuse, adoption sustainability and so on. This focus group was targeted to companies, organisations, cities with experience in EU projects, with prior experience in projects financed by Connecting Europe Facility.

3.2 FIWARE summit

The FIWARE Global Summit 2023 was a highly anticipated international conference centered around the FIWARE open-source platform for smart solutions. It brings together developers, innovators, and industry experts from diverse sectors. Attendees can expect engaging keynote speeches, panel discussions, and workshops to foster collaboration and knowledge sharing. Real-world success stories and applications built on FIWARE will be showcased, highlighting its impact across various domains. The event provides an invaluable opportunity for networking and exploring the latest advancements in the FIWARE ecosystem.

The Closing Event of the Connecting Europe Facility (CEF) Projects at the FIWARE Global Summit was a resounding success, showcasing the remarkable achievements of projects like GreenMov, ODALA, and INTERSTAT. These projects have empowered public administrations by offering easily deployable solutions focused on Open Data initiatives. GreenMov demonstrated its ability to transform raw data into smart

Document name:	D6.4 GreenMov Final Workshop				Page:	14 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

mobility services, promoting sustainable transportation and enhancing citizens' quality of life. ODALA emphasized the importance of collaborative and secure open-source data lakes for cities, enabling data-driven decision-making for smarter urban environments. INTERSTAT enabled interoperability for linked open statistical data, facilitating accurate information exchange for evidence-based governance. The event also encouraged reflection, sharing best practices, and exploring future prospects for continuous improvement and digital innovation.

3.3 Agenda

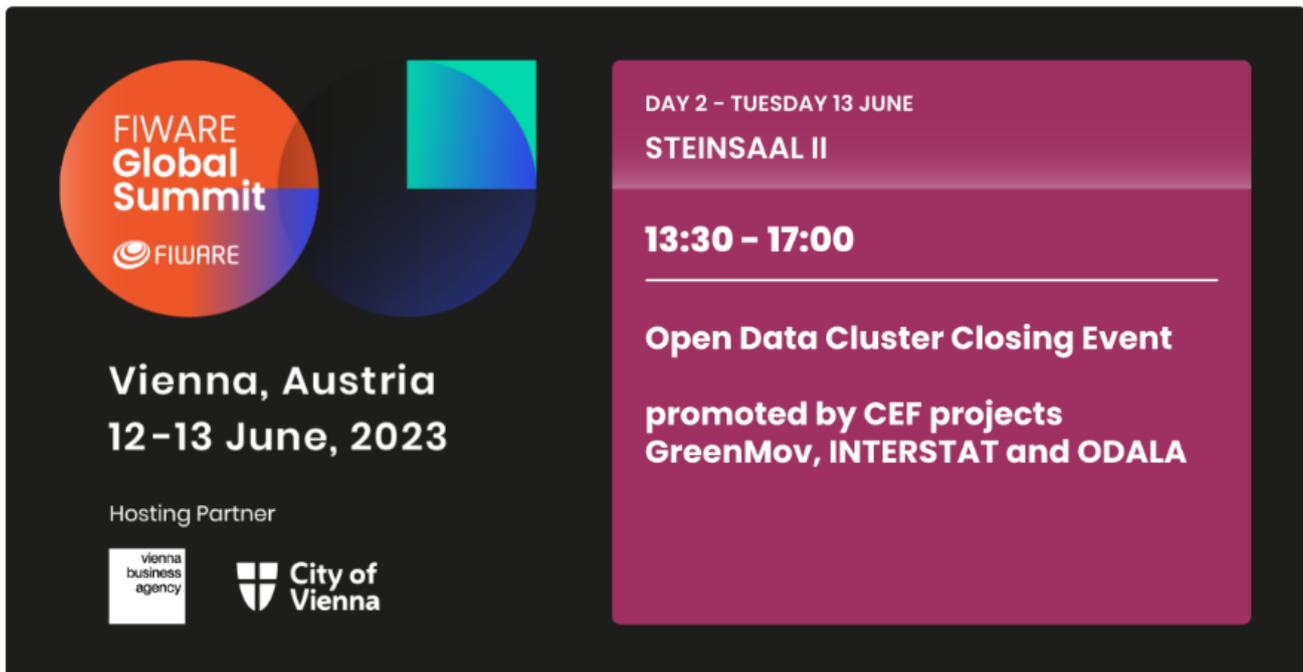


Figure 5 Announcement of the Open Data Cluster Closing Event

Moderator: Stefano De Panfilis (COO FIWARE Foundation)

AGENDA:

13:30 – 13:45 Semantic challenges in Open data: The role of Interoperable Europe – Pavlina Fragkou, Project Manager at the European Commission.

13:45 – 15:15 From raw data to smart mobility services for citizens – Carmen Perea Escribano coordinator of GreenMov (EVIDEN), Benoit Couraud Université Côte d’Azur and Miguel Aguilar, Smart services for green mobility activity in GreenMov, EVIDEN.

15:15 – 15:25 Annelies De Craene, Product Owner, Flanders Smart Data Space.

15:25 – 15:30 Q&A.

15:30: 16:00 Coffee Break.

16:00 – 16:30 Collaborative, Secure and Replicable Open Source ‘Data Lakes’ for Cities – Benjamin Ditel, coordinator ODALA, Data and Tech Enabler, City of Kiel and Paolo Scicolone, ATAM Spa, City of Arezzo.

Document name:	D6.4 GreenMov Final Workshop				Page:	15 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

16:30 – 17:00 Enabling interoperability for Linked Open Statistical Data – Martino Maggio, Coordinator of INTERSTAT, 16:10 – Engineering, Giuseppina Ruocco, ISTAT, Franck Cotton, INSEE.

17:00 – 17:10 Q&A and Conclusion.

3.4 Attendance

List of participants, including their names, affiliations, and roles in the workshop.

Attendance list			
Participant	Affiliation	Role	Project
Aguilar, Miguel	ATOS	Attendee	GreenMov
Alonso, Alvaro	UPM	Attendee	
Abella, Alberto	FF	Attendee	
Callens, Tom	Digital Flanders	Attendee	GreenMov
Campolargo, Margarida	OASC	Attendee	ODALA
Chernikova, Kseniia	FF	Attendee	Organization
Comte Frédéric	INSEE	Attendee	INTERSTAT
Cotton, Franck	INSEE	Attendee	INTERSTAT
Coenen, Tanguy	IMEC	Attendee	
Courad, Benoit	IMREDD	Attendee	GreenMov
D'Agresti, Francesca	Engineering	Attendee	INTERSTAT
De Craene, Annelies	Digital Flanders	Presenter	
De Panfilis, Stefano	FF	Session Moderator	
De Smedt, Rudy	Atos Belgium	Attendee	
De Tant, Gert	Sirus	Attendee	ODALA
Ditel, Benjamin	City of Kiel	Attendee	ODALA
Francangeli, Paolo	ISTAT	Attendee	INTERSTAT
Fragkou, Pavlina	European Commission	Online Presenter	

Document name:	D6.4 GreenMov Final Workshop				Page:	16 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

Attendance list			
Participant	Affiliation	Role	Project
Jara, Antonio	HOPU/Libelium	Attendee	GreenMov
Leroux, Philip	IMEC	Attendee	
López Aguilar, Fernando	FF	Attendee	
Maggio, Martino	Engineering	Attendee	INTERSTAT
Melyshi Xhulia	FF	Attendee	GreenMov
Nafkha, Mehdi	IMREDD	Attendee	GreenMov
Perea, Carmen	ATOS	Attendee	GreenMov
Pezuela, Clara	FF	Attendee	
Rodriguez, María Guadalupe	ATOS	Online Attendee	GreenMov
Rojas, Julian	IMEC	Attendee	
Ruocco, Giuseppina	ISTAT	Attendee	INTERSTAT
Scicolone, Paolo	ATAM Arezzo	Attendee	ODALA
Severi, Filippo	Phoops	Attendee	ODALA
Tailhurat, Romain	INSEE	Attendee	INTERSTAT
Tsirantonaki, Fani	HADEA	Online Attendee	GreenMov Project Officer
Van de Vyvere, Brecht	Sirus	Attendee	

Document name:	D6.4 GreenMov Final Workshop				Page:	17 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final



Figure 6 Attendees during the event. Source: GreenMov consortium.

Document name:	D6.4 GreenMov Final Workshop				Page:	18 of 31	
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status:	Final

4 Workshop Presentations

4.1 Semantic challenges in Open data: The role of Interoperable Europe



Figure 7 Agenda of the slot: "Semantic challenges in Open data: The role of Interoperable Europe "

Pavlina Fragkou, Project Manager at the European Commission presented “Semantic challenges in Open data: The role of Interoperable Europe”.

The presentation provided a comprehensive overview of the Interoperability situation in Europe.

Commencing its discourse, the presentation delved into the underlying factors contributing to the deficiency in interoperability among services and data across the European landscape. The following factors were mentioned in the presentation.

- “Inefficient governance of interoperability efforts”,
- “Lack of common minimum interoperability specifications”,
- “Lack of an interoperability by default approach.”.

This functioned to serve as an introduction to the rationales underpinning the development of a comprehensive legislative package.

After this, the ambition and objectives of the Interoperable Europe Act was introduced. The main objective “Help EU and Member States administrations to deliver connected digital services to citizens and business across Europe”. Focus on a human-centric EU approach, establishing an interoperability governance structure and creating an ecosystem of interoperable solutions.

In addition, the scope and legal basis of the act was explained.

Document name:	D6.4 GreenMov Final Workshop				Page:	19 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

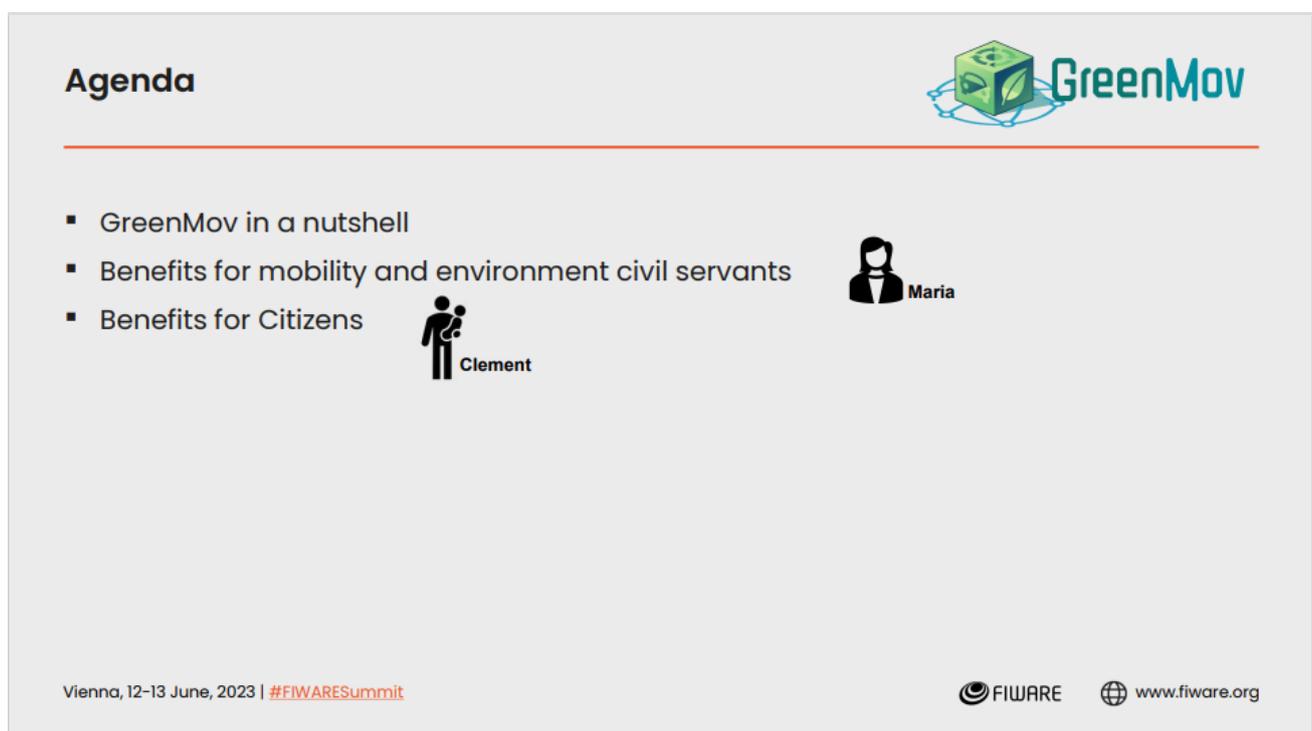
On the other hand, the SEMIC action was explained: “To promote Semantic Interoperability amongst the EU Member *States*” through facilitating the promotion, sharing, and reuse of semantic assets, experiences, and tools, identifying opportunities and raising awareness.

Moreover, several assets/initiatives in the domain were introduced:

- DCAT-AP: DCAT Application profile for data portals in Europe (DCAT-AP) is a specification based on W3C's Data Catalogue vocabulary (DCAT) for describing public sector datasets in Europe. [1]
- High Value data sets and the High Value Data Sets implementing act with the main objective “of establishing the list of high-value datasets is to ensure that public data of highest socio-economic potential are made available for re-use with minimal legal and technical restriction and free of charge in order to speed up the emergence of value-added EU-wide information products”. [2]
- GeoDCAT-AP is an extension of DCAT-AP for geospatial datasets.
- Dataspaces: “Data spaces are ecosystems that data providers, intermediaries, and users can access to share data. This ensures that more data becomes available in the economy and society but leaves the control in the hands of companies and individuals who generate the data”. [3]

In summation, the presentation furnished a comprehensive survey of the Interoperability panorama within Europe, elucidating legislative endeavours and pertinent resources that underpin and nurture the harmonization of data and services. This groundwork effectively paved the path for the ensuing project presentations.

4.2 From raw data to smart mobility services for citizens



Agenda

- GreenMov in a nutshell
- Benefits for mobility and environment civil servants
- Benefits for Citizens

Speakers: Clement (icon of a person with a child), Maria (icon of a woman).

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FIWARE | www.fiware.org

Figure 8 Agenda of the slot: “From raw data to smart mobility services for citizens”

Document name:	D6.4 GreenMov Final Workshop				Page:	20 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

The presentation “From raw data to smart mobility services for citizens” were provided by the GreenMov team. Concretely by:

- Carmen Perea Escribano coordinator of GreenMov (ATOS-EVIDEN).
- Benoit Couraud (Université Côte d’Azur).
- Miguel Aguilar, Smart services for green mobility activity in GreenMov, (ATOS-EVIDEN).

The intent behind the presentation was to elucidate the public on how GreenMov effectively addresses the challenges faced by actual individuals. In pursuit of this objective, a pair of users were meticulously chosen as exemplars:

- A Mobility Civil Servant (Maria).
- An ordinary citizen Clement.

The presentation started with an overview about GreenMov. After this, Benoit Couraud shown how GreenMov solves Maria Problems Maria is mobility and environment civil servant in Spain.

To finalize Miguel Aguilar shown how GreenMov solve Clement’s problems, Clement is new father and a musician, Clement wants to be spent as much time as possible with this child.

The overview commenced by presenting the numerous challenges encountered by cities, ranging from overpopulation to mobility issues, traffic congestion, pollution reduction, implementation of efficient transportation systems, and road maintenance.

After his the GreenMov mission was stated [4]:

- “Definition and development of harmonized data models for green mobility”
- “Development of digital services for calculation and forecasting of noise, air quality bikes availability and traffic related data”
- “Architecture of federated context data to tackle high demand scenarios in mobility”

Subsequently, the primary characteristics of pilots in various cities were elucidated (Nice, Molina de Segura, Murcia and Flanders).

Following that the GreenMov Smart Data Models were presented grouped by Adopted data models, Extended data models and new data models.

Furthermore, the Smart Mobility Services created during the project were introduced:

- Air quality forecasting,
- Air quality index calculation,
- Traffic forecasting,
- Traffic environmental impact calculation,
- Traffic recommendation,
- Bikes availability forecasting,
- Noise annoyance forecasting,
- Noise annoyance calculation.

Document name:	D6.4 GreenMov Final Workshop				Page:	21 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

After this the GreenMov main outcomes were presented:

- Reference architecture,
- 3 extended Smart Data Models and 9 new Smart Data Models,
- Some OSLO vocabularies and app profiles contextualized for mobility,
- 8 Smart Mobility Services,
- A new building block for solving federated queries across multiple Context Brokers,
- Whitepaper with lessons learnt.

To finalize the overview the impact for different stakeholders were presented: For FIWARE, cities, IT companies and citizens.

For FIWARE the contribution to Smart Data Models and the components for Federation, for cities, the project aims to increase the efficiency of their mobility services, reduce infrastructure costs, and avoid data silos and vendor locking, for IT companies, the project aims to facilitate the development of added value services for mobility and provide access to open mobility data, finally, for citizens, the project aims to provide more efficient mobility services and promote sustainable living in cities.

- GreenMov for a Mobility Civil Servant (Maria)

In summary, the GreenMov project offers a robust solution for cities grappling with complex urban mobility issues. From the perspective of a civil servant, the project's advanced infrastructure is noteworthy. Utilizing FIWARE components and smart data models, GreenMov has developed a system for efficiently collecting and centralizing data from diverse sensors, such as those measuring air quality, bike availability, and noise levels. This comprehensive data acquisition platform provides real-time insights, essential for informed decision-making in urban planning and transportation management.

Regarding the project's milestones, three key achievements are particularly relevant to municipalities. Firstly, GreenMov has successfully customized and extended existing smart data models to meet the unique needs of urban mobility. Secondly, the project has listed three innovative services on the FIWARE Marketplace, broadening its range of solutions for cities. Lastly, GreenMov has proposed a sophisticated architecture that not only ingests and centralizes sensor data but also makes it available through an accessible API. This sets the stage for the future integration of advanced analytics and AI technologies, thereby providing city planners with the tools needed to develop smarter and more sustainable mobility solutions.

- GreenMov for an ordinary citizen (Clement)

In the context of the GreenMov project, which aims to enhance urban mobility through the integration of AI-based services, five distinct services have been developed: Air Quality Monitoring, Noise Annoyance Detection, Bikes Availability Forecasting, Traffic Forecasting, and Traffic Recommendation. Each service leverages advanced artificial intelligence techniques for real-time data analysis and predictive modelling. Utilizing the previously described infrastructure that incorporates FIWARE components and smart data models, these services extract, transform, and serve data in a cohesive manner, thereby aiding municipalities in urban planning and real-time decision-making.

The presentation structure offers a practical narrative by focusing on Clement, a family man who plans to attend a concert and is concerned about the availability of bikes at the train station in the city where the concert is being held. Through GreenMov's Bikes Availability Forecasting service, which is deployed on the

Document name:	D6.4 GreenMov Final Workshop				Page:	22 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

aforementioned infrastructure and employs technologies like MLFlow [5] or KServe [6], Clement is able to gain real-time insights into bike availability. This user-centric approach not only illustrates the practical applications of GreenMov's AI-based services but also underscores the project's commitment to addressing real-world urban mobility challenges.

4.3 Flanders Smart Data Space: Building linked data ecosystems.



Figure 9 Annelies De Craene (Digital Flanders), presented Flanders Smart Data Space. Source: GreenMov consortium.

Document name:	D6.4 GreenMov Final Workshop				Page:	23 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

In the presentation "From Data to Value: Building Linked Data Ecosystems in Flanders Smart Data Space", Annelies De Craene highlighted key aspects of this innovative approach. She emphasised open-source principles, open standards and an open community to facilitate the flow of data.

The workshop identified three main challenges to the smooth flow of data. First, the lack of data outlets and standardised pathways limits the seamless transfer of information. In addition, concerns about losing control of data and a lack of mutual trust between stakeholders are barriers. To overcome these barriers, the workshop introduced the concept of interoperability at different levels. This includes the use of standards such as OSLO and LDES, the use of linked data technology in real-time contexts, and the promotion of ecosystems involving both the public and private sectors. The importance of clear governance and a trust-based approach was emphasised in order to create a level playing field within the Flanders Smart Data Space.

The core principles of the Flanders Smart Data Space were highlighted, including concepts such as governance for trust and compliance management, a broad ecosystem, linked data, open-source building blocks, decentralised data sharing solutions, real-time data and accessible data. The presentation showed how data flows through different stages involving data owners, data publishers, data intermediaries, data service providers and data users. The workshop showed practical implementations of this flow, illustrated with some of the developments provided by projects such as CEF ODALA (e.g.: water quality) and GreenMov (e.g.: bicycle availability).

Annelies De Craene drew the journey of turning data into value within the Flanders Smart Data Space. By focusing on open collaboration, interoperability and clear governance, the initiative aims to overcome challenges and create a dynamic ecosystem where data seamlessly contributes to valuable insights and services.

Document name:	D6.4 GreenMov Final Workshop				Page:	24 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

4.4 Collaborative, Secure and Replicable Open Source ‘Data Lakes’ for Cities



Figure 10 ODALA Project agenda. Source: ODALA Project.

The first presentation of ODALA project was provided by Benjamin Ditel coordinator of ODALA project.

Collaborative, Secure and Replicable Open Source 'Data Lakes' for Cities.

The presenter provides a comprehensive overview of the project Firstly he introduced the Consortium. Later, the goals of the consortium were presented:

- Improve data management in cities,
- Best practices,
- Manage real-time and historical data,
- Leverage existing building blocks.

After this, the ODALA Datalake was described. ODALA fosters collaboration between public administrations and private organizations. Furthermore, the components Security toolkit, the Federation concept, the imec Obelisk catalogue and the Dataspaces relations were explained by the ODDALA coordinator.

Continuing with ODALA results, Paolo Scicolone of ATAM Spa provided a presentation about the ODALA Travel Planner and Mobility Dashboard

Paolo Scicolone began by introducing the organizations involved in the project, in particular ATAM Spa, the public company responsible for mobility and parking management in the municipality of Arezzo.

He pointed out that the aim of the project, in which ATAM and Phoops are working together, is to improve the management and analysis of mobility data in the Comune di Arezzo through the components of the

Document name:	D6.4 GreenMov Final Workshop				Page:	25 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

ODALA project, by developing customised modules, for which in recent years the "Parking Platform" has been developed, which allows the purchase of tickets and parking passes for the city and, more recently, automatic access to off-street parking.

According to Paolo Scicolone, two components have been developed specifically for the ODALA project: "Travel Planner" and "Movility Dashboard", which have been installed on the Arezzo cloud platform together with the associated environmental sensors.

The presentation continued with a demonstration of these components.

The Travel Planner displays information on public transport in the Arezzo metropolitan area, together with scheduled arrivals and departures in real time. In addition, it allows the geocoding of the departure and arrival directions of routes, and the planner provides possible solutions for both public and private travel.

Paolo explained the main features of this component and the architecture used to build it.

As for the Mobility Dashboard, it is a component that allows the collection and display of information about the occupancy of parking spaces, both on-street and off-street, bus stops and gates for restricted traffic.

Finally, Paolo summarised the benefits that the ODALA project has brought to the Municipality of Arezzo.

4.5 Enabling interoperability for Linked Open Statistical Data

The Project INTERSTAT [7] was presented by Martino Maggio (Engineering), Giuseppina Ruocco (ISTAT), Franck Cotton (INSEE).

The presentation was structured as follows:

- Statistical data and Interoperability,
- INTERSTAT Project,
- INTERSTAT Objectives,
- INTERSTAT Framework,
- Key Standards,
- Cross border pilot services,
- Data Pipelines,
- Evaluation of the outcome.

A description of the INTERSTAT project was provided:

“The overall objective of INTERSTAT is to develop a framework that will allow the interoperability, by using technical assets and common ontologies, between national statistical portals and the European Data portal and the deployment of cross-border services that reuse European statistical open datasets from those portals.”

After this the INTERSTAT objectives were presented. The project aims to establish interoperability between various national statistical portals and the European Data Portal by employing standardized approaches and tools for automating metadata alignment and data publication. The objectives encompass the provision of methodologies, standards, and tools for achieving data harmonization. Furthermore, the project seeks to offer uniform technical interfaces that facilitate the seamless reuse of standardized statistical information. This entails adopting the CEF Context Broker Building Block and implementing the ETSI NGSI-LD API

Document name:	D6.4 GreenMov Final Workshop				Page:	26 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

specification. The endeavour also includes the development of tools to simplify the visualization and analysis of statistical data for non-technical users. The proposed solutions are to be validated through the deployment and testing of cross-border end-user services, centred around Population and Households Census, utilizing harmonized statistical data in conjunction with open datasets from the European Data Portal and other national open data repositories.

Following that, the INTERSTA Technical Framework was presented. It provides:

- The harmonisation of the Linked Open Statistical Data (LOSD),
- Idra Open Data federation platform
- The CEF Context Broker Building Block that allows the access to the LOSD through the NGSI-LD models and API
- A set of open APIs based on different standards.

Later, the presenter expressed their interest on the following standards: SDMX [8], DCAT-AP [1] and ETSI NGSI-LD [9].

After this, the following cross-border pilot services were presented:

- S4Y – The school for you: "The service known as 'The School for You' offers families comprehensive access to amalgamated data from diverse school web portals and the Census of Population and Dwellings. This service facilitates informed decision-making by assisting families in selecting the optimal educational institution for their children within a designated urban locality".
- Geolocalized Facilities “This application provides information about geolocalised events and infrastructures to provide decision support to the user”.
- Support for Environment Policies: “This use case has the objective to support local policy makers who have to take decisions about environmental policies to be applied in a city”.

Later, the Data Pipelines approaches used in the project were presented: a generalized ETL approach and a domain knowledge approach.

To finalize the presentation a survey designed by the project to evaluate the project outcomes was presented.

Document name:	D6.4 GreenMov Final Workshop				Page:	27 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

5 Workshop Feedback

5.1 Questions and Answers

During the GreenMov time slot, several questions were raised by the attendees.:

Question: Have you considered the “Human in the loop”

Answer: Human-in-the-loop (HITL) in machine learning refers to an interactive approach that combines the capabilities of both artificial intelligence systems and human expertise to improve the overall performance and reliability of the learning process. Including human feedback in the Machine Learning Operations process has many advantages, such as improvements in performance, precision, and safety. As a future line of work, HILT techniques could be added, but this requires profound changes in the service's architecture, as well as the development of a frontend that allows users (the very humans in the loop) to provide feedback.

Question: What about the Accuracy of the services?

Answer: The accuracy of the services meets the proposed KPIs. Accuracy is calculated using different windows (the number of samples predicted and included in the metrics calculation) depending on the service. For example, the Air Quality Service uses a window of 48 in an hourly based period, while the Bike Availability Service uses around two hours in a 15-minute period. These requirements are set up for each use case.

Question: What feedback could you give on the use of the European Data portals?

Answer: The use of the European Data portal was extremely simple, and it worked pretty well. We only had to upload our dataset on the national open data portal, and after a few hours, this dataset was directly uploaded into the European Data portal. The process was very simple and efficient. About the drawbacks: until June, the gathering of the metadata was not working properly, and led to many errors in the meta data on the European Data Portal. However, this import of metadata has changed lately, and seems much more efficient. Another drawback is that all datasets are uploaded automatically, and as a consequence, there are many datasets in the European Data Portal, and even some with a bad quality. A second consequence is that the search of a specific dataset will give many outputs that are not related.

5.2 Stakeholders Personal Opinion

The following subsection contains the particular opinions of some GreenMov participants. This includes enriching the report.

Miguel Aguilar (ATOS) “Participating in the FIWARE Summit was an exceptional opportunity, where I had the privilege of presenting the European project GreenMov during Activity 3, which specifically centered around the implementation of artificial intelligence solutions. In this session, I showcased our integral role in coordinating and developing these AI services aimed at revolutionizing urban mobility in major cities. As a platform open to a wide spectrum of FIWARE enthusiasts, from startups to industry leaders, the event highlighted technology's capacity to reshape societies and markets. GreenMov's focus on coordinating and advancing artificial intelligence services to enhance urban mobility aligned seamlessly with FIWARE's

Document name:	D6.4 GreenMov Final Workshop				Page:	28 of 31	
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status:	Final

mission. Interacting with diverse professionals, including developers, CEOs, and strategists, deepened my understanding of technology's potential for positive change. This summit reinforced my belief in collaborative innovation as a catalyst for global transformation.”

Alberto Abella (FF) “The most valuable point for me individually was the mapping of OSLO data models and, in fact, we developed a new feature for holding the original linked data URIs while maintaining the automatic URIs of Smart data models, beyond the experience of the mapping of a complex ontology. “

Filip Gossele (IMEC) “As Imec representative it was a pleasure to share and exchange the positive experiences in the CEF GreenMov project. Across borders and between different organisations we found common ground to make different standards (e.g. NGS-LD and LDES, SMD and OSLO) work together and deliver a working prototype with IMEC, FIWARE and EVIDEN components.

As is in any project it took some time to get up to speed but created a strong team with a common goal.”

Carmen Perea (ATOS- EVIDEN): “The workshop provided an excellent platform to exchange knowledge and information. Several interesting conversations took place during the workshop. It was very gratifying to share experiences with other counterparts. We hope that our work will pave the way for others. “

5.3 Some publications after the meeting

5.3.1 On the Web of the projects:

- GreenMov web [link](#)
- Interstat web [link](#)
- ODALA web [link](#)

5.3.2 On YouTube

This video was created by the FF and can be seen in the following [link](#)

Document name:	D6.4 GreenMov Final Workshop				Page:	29 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final

6 Conclusion

The event culminated in resounding success.

Firstly, the exchange of knowledge and insights among diverse stakeholders underscored the value of collaborative efforts in tackling intricate challenges. The engagement and active participation of attendees, as reflected in the Q&A sessions and the personal opinions of stakeholders, affirmed the significance of the workshop's themes. The diverse backgrounds and perspectives of the participants contributed to vibrant discussions that fostered a more comprehensive understanding of the subject matter.

The dissemination of knowledge served to extend the workshop's impact beyond the immediate attendees.

In conclusion, the workshop not only achieved its intended objectives but also succeeded in creating a dynamic arena for the exchange of ideas, experiences, and solutions. The event's success was evidenced by the rich interactions, valuable presentations, positive feedback, and the anticipation of subsequent initiatives. The workshop's ripple effect is poised to drive further advancements and collaborations in the realm of interoperable data ecosystems and open data challenges.

The GreenMov consortium accords substantial significance to the event, deeming it an exceedingly pertinent occasion to exchange experiences with fellow Connecting Europe Facility (CEF) projects. The event not only provides a platform to showcase our endeavors but also offers a direct avenue for their evaluation, besides amplifying the project's ecosystem.

Document name:	D6.4 GreenMov Final Workshop				Page:	30 of 31	
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status:	Final

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Document name:	D6.4 GreenMov Final Workshop				Page:	31 of 31
Reference:	D6.4	Dissemination:	PU	Version:	1.0	Status: Final