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Horizon Europe

EUROPEAN COMMISSION

European Climate, Infrastructure and Environment Executive Agency (CINEA)

Grant agreement no. 101056765



## Electric Vehicles Management for carbon neutrality in Europe

### Deliverable D 11.1 Data Management Plan

#### Document Details

Due date	30-11-2022
Actual delivery date	30-11-2022
Lead Contractor	INESC-ID
Version	1.0
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Dissemination Level	Public
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#### Project Contractual Details

Project Title	Electric Vehicles Management for carbon neutrality in Europe
Project Acronym	EV4EU
Grant Agreement No.	101056765
Project Start Date	01-06-2022
Project End Date	30-11-2025
Duration	42 months

## Document History

Version	Date	Contributor(s)	Description
0.1	06-09-2022	INESC-ID	Table of contents
0.2	06-10-2022	INESC-ID	Sections 1,2
0.3	21-10-2022	INESC-ID	Sections 3
0.4	25-11-2022	DTU & EDP NEW	Internal review
1.0	30-11-2022	INESC-ID	Final version

## **Disclaimer**

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## **Acknowledgment**

This document is a deliverable of EV4EU project. EV4EU has received funding from the European Union's Horizon Europe programme under grant agreement no. 101056765.



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## Executive Summary

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This deliverable presents the first version of the EV4EU Data Management Plan (DMP) and aims to contribute to good data handling within the EV4EU project, by indicating what research data is expected to be generated and which parts of the data can be shared with the scientific community and electric mobility industry. Additionally, the DMP provides recommendations on metadata definition and structure, research data storage and how to make open data publicly available.

The DMP will present the main aspects, rules and guidelines to be considered on the EV4EU project for data management and includes also a list of EV4EU deliverables.

The DMP will be updated at M36 (D11.2) or whenever changes are applied. This deliverable has been prepared by the leader of Work Package (WP) 11 – INESC-ID. This document is also complemented by a Data Definition Catalogue (DDC), which is a day-to-day data management and monitoring excel file that will be continuously updated to reflect actual data generation. The maintenance of the DDC is the responsibility of the Project Manager, supported by the work package and task leaders.

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## Acronym

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Cauthor	Corresponding Author
CodeRep	Project Code Repository
DataRep	Project Open Data Repository
DDC	Data Definition Catalogue
DMP	Data Management Plan
DMPLeader	Data Management Plan Leader
DOI	Digital Object Identifier
DSO	Distribution Service Operator
EC	European Commission
ECSite	Project Site at EC CORDIS
EV	Electric Vehicle
FAIR	Data Findable, Accessible, Interoperable, Re-usable data
GA	Grant Agreement
GDPR	General Data Protection Regulation
H2020	Horizon 2020
IPR	Intellectual Property Rights
OA	Open Access
PC	Project Coordinator
PM	Project Manager
PrivRep	Project Private Repository
PublisherSite	Journal and Conference Publishers Sites
TaskLeader	Task Leader
UC	Use Case
V2G	Vehicle-to-Grid
V2X	Vehicle-to-Everything
WP	Work Package
WPLeader	Work Package Leader



## Glossary

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CC licence	Creative Commons licences are tools to grant copyright permissions to creative work.
CC-BY	This CC-licence lets others distribute, remix, tweak, and build upon your work, even commercially, if they credit you for the original creation. This is the most accommodating of licences offered. Recommended for maximum dissemination and use of licensed materials.
CC-BY-NC	This CC-licence lets others remix, tweak, and build upon your work noncommercially, and although their new work must also acknowledge you and be non-commercial, they don't have to license their derivative works on the same terms.
CC-BY-SA	This CC-licence lets others remix, tweak, and build upon your work even for commercial purposes, if they credit you and license their new creations under the identical terms. This licence is often compared to "copyleft" free and open-source software licences. All new works based on yours will carry the same licence, so any derivatives will also allow commercial use.
CORDIS	The Community Research and Development Information Service is the European Commission's primary source of results from the projects funded by the EU's framework programmes for research and innovation, from FP1 to Horizon Europe.
DDC	Data Definition Catalogue, this is an Excel file designed to collect and classify the data elements produced in the scope of the project.
WebSite	Project Public Website

## 1 Introduction

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### 1.1 General Context

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EV4EU project complies with the Commission's Open Research Data Management, aiming at improving and maximising access to and re-use of research data generated in any funded projects. However, EV4EU follows a balanced strategy between data openness and protection of scientific information, commercialisation, Intellectual Property Rights (IPR), privacy concerns, security, as well as data management and preservation questions, thus EV4EU shall follow the concept of "*as open as possible as closed as necessary*".

The Data Management Plan (DMP) defines the data management life cycle for the data to be collected, processed, and generated throughout the project. The partners of the project agreed to publish most of their data in trusted repositories and data infrastructures, and provide open access through them, following different types of licences as suitable. Exceptions to open access shall be duly justified in the scope of this DMP. As part of making research data findable, accessible, interoperable, and reusable (based on the FAIR principles), the DMP will include information on (i) the handling of research data during and after the end of the project; (ii) what data will be collected, processed, and/or generated; (iii) which methodology and standards will be applied; (iv) which data will be shared/made open access; and (v) how data will be curated and preserved (including after the end of the project).

Updates of this DMP will be submitted at M36 (D11.2), as stated in the Grant Agreement (GA), or whenever relevant.

### 1.2 Document Structure

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This deliverable is structured in four parts. Section 1 is the introduction providing a general context in the organization of this deliverable. Section 2 describes the general background and concepts behind the definition of the DMP, namely: Horizon Europe contractual basis for Open Science, FAIR Principles and Open Science Practices, DMP General Concerns including Data Privacy and the EU GDPR, Open Access Publications, Repositories for Research Data, and Licences schema for datasets, publications, and software. Section 3 presents the main aspects, rules and recommendations of this specific DMP including: (i) data summary, (ii) FAIR data, (iii) other research outputs, (iv) allocation of resources, (v) data security, (vi) organizations and roles performed by the partners and people directly associated, (vii) workflow to define and manage the DMP itself, and (viii) concrete rules and recommendations for managing and sharing the project data (Deliverables, Publications, Datasets, Software code, and Other data elements). In addition, this part includes (ix) the complete list of deliverables. Section 4 presents conclusions and considerations regarding this deliverable.

This DMP deliverable is supported and complemented by an additional artifact: the "Data Definition Catalogue", defined as an Excel file (xlsx format) available in the EV4EU SharePoint folder.

### 1.3 Relationship with Other Deliverables

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The DMP is part of WP 11- Management and Data Management. This deliverable is closely linked to all activities and deliverables concerning data collection and analysis from all WPs. The primary sources of data generation will be mainly regarding user adoption (WP3) and the demonstration activities (WP6, WP7, WP8 and WP9) (Figure 1).

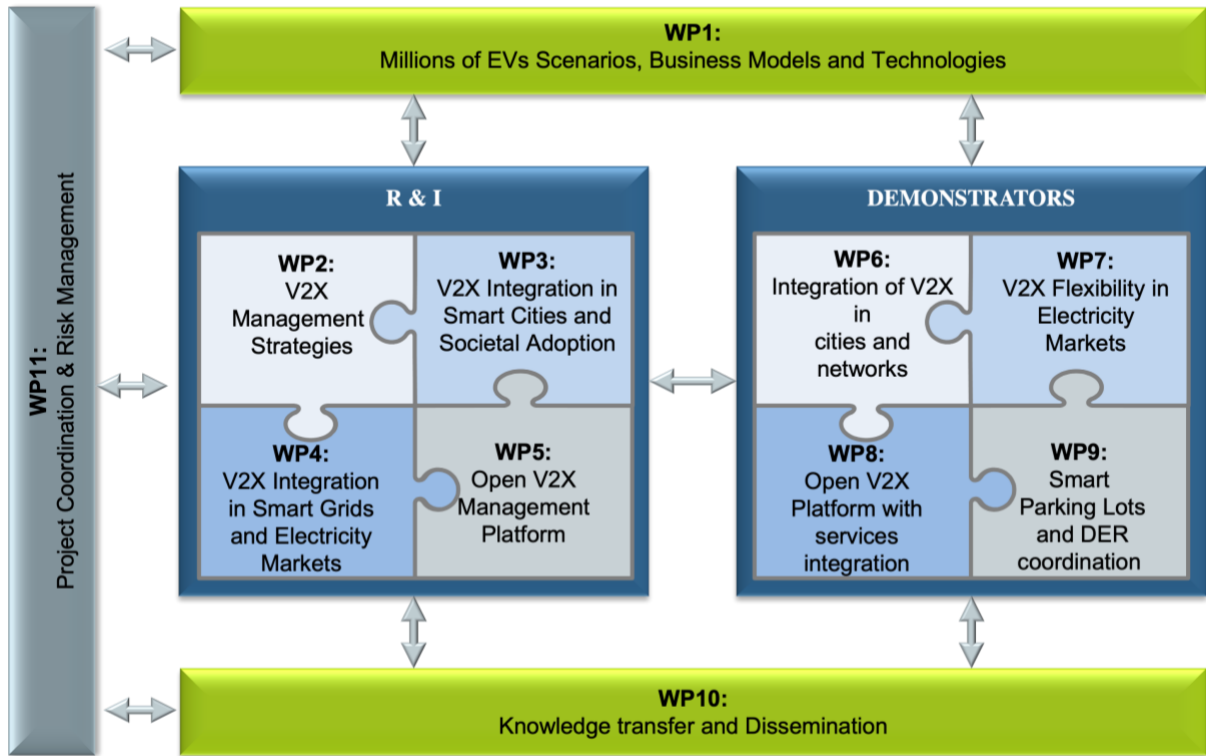


Figure 1 – EV4EU Work Packages Identification and Organization (from EV4EU grant proposal)

## 2 Background

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The EV4EU Project will comply with the policies established for Horizon Europe programme. Section 2 describes the general concepts underlying the definition of the DMP, including Horizon Europe Contractual Basis for Open Science (Section 2.1), Fair principles and Open Science Practices (Section 2.2), DMP General Concerns (Section 2.3), Data Privacy (Section 2.4), Open Access Publications (Section 2.5), Licences (Section 2.6), and Repositories for Research Data (Section 2.7).

### 2.1 Horizon Europe Contractual Basis for Open Science

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According to the programme guide for Horizon Europe developed by the EC, the Horizon Europe is moving from Open Access (H2020) to Open Science, requiring mandatory and recommended open science practices that are described in article 17, annexe 5 of the GA [1,2]. Article 17 states that “*the beneficiaries must ensure open access to peer-reviewed scientific publications relating to their results*” [2]. For this purpose, the beneficiaries should share their research as soon as possible, and make use of pre-prints, open science journals and trusted repositories. Furthermore, beneficiaries shall follow the principle that data should be “as open as possible, as closed as necessary”, and when possible, make accessible other elements (data, software, etc) related to scientific publications for third parties to exploit, reproduce and disseminate — free of charge.

The mandatory open science practices described in the mentioned article 17 ensure that scientific publications are open access and there is responsible management of the research data in line with the FAIR principles (see Section 2.2). It also guarantees that all information regarding research outputs, tools and instruments needed to validate the conclusions of the publications are open and there is digital access to the results to validate the conclusions of the papers, “unless providing open access would in particular be against the beneficiary’s legitimate interests, including regarding commercial exploitation” [2]. In case of public emergency, all research outputs should be made open access immediately if requested by the granting authority [2].

### 2.2 FAIR Principles and Open Science Practices

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The Findable, Accessible, Interoperable, and Reusable (FAIR) principles for research data management were defined after the “*Jointly designing the data FAIRPORT*” international conference that occurred in January 2014 [3] and published in Nature’s Journal of Scientific Data in 2016 [4]. From here, the principles were rapidly adopted around the world as the foundation for data management and research policy [5]. Several funding research agencies are now requiring that their funded projects follow the FAIR data principles, such as the European Commission (EC), which requires that each EC project includes a Data Management Plan (DMP) in accordance with FAIR data [1].

The FAIR principles guarantee that data is easier to find, access, reference, represent and combine, using qualified links. These principles also assure that the original data is easily identified and managed through a specific licence to, above all, ensure data reuse [6]. As stated in its original paper, “*the FAIR principles put specific emphasis on enhancing the ability of machines to automatically find and use the data, in addition to supporting its reuse by individuals*” [4]. These principles not only apply to data, but also to the algorithms, tools, and workflows that lead to these data. Except for sensitive information, all components of the research must be available to ensure transparency and reproducibility and to maximise data reuse [4].

## 2.3 DMP General Concerns

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According to the “Practical guide to the international alignment of research data management” [7], DMPs should consider at least six important topics, stating that “these topics and questions form the core requirements (...) to develop a useful DMP”. Those topics are described in [7] and are:

1. Data description and collection or re-use of existing data: description on how and which data are collected, produced, and re-used.
2. Documentation and data quality: data description by relevant metadata and data quality control.
3. Storage and backup during the research process: description of data and metadata storage, security, and sensitive data protection.
4. Legal and ethical requirements, codes of conduct: description of personal data processing, compliance with legislation on personal data, data security, management of intellectual property rights and ownership .
5. Data sharing and long-term preservation: description on data sharing, preservation and identification.
6. Data management responsibilities and resources: identification of the responsible for data management and resources needed to data management and to ensure that data will be FAIR.

The concerns and questions referred in the previous section guide the definition of this DMP and its complementary artifact Data Definition Catalogue (in xlsx format).

## 2.4 Data Privacy

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Privacy and personal data management are strong concerns of the contemporary society. Due to that, most of the nations and international federations have produced and put in practice several strict laws to prevent or mitigate abuses and misbehaviors. The EU GDPR was put into effect on May 25, 2018 and is considered as one of the toughest privacy and security laws in the world [8].

GDPR establishes rules to protect fundamental rights of natural persons concerning the processing and free moving of personal data. It states that “the free movement of personal data within the Union shall be neither restricted nor prohibited for reasons connected with the protection of natural persons with regard to the processing of personal data” [9].

GDPR defines several principles and rights of the data subject that shall be considered by any organization or individual that collects, processes, or discloses personal data. Thus, in the scope of the EV4EU project, all its partners shall be compliant with GDPR. Specifically, and as stated in the GA, all partners must ensure that personal data is “processed lawfully, fairly and in a transparent manner in relation to the data subjects”, is “collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes”, is “adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed”, is “accurate and kept up to date”, is “kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the data is processed and processed in a manner that ensures appropriate security of the data” [2].

In addition, throughout the project, contracts with clients will be signed so that relevant equipment can be installed in their homes and their data collected. The rules about ownership of this equipment will be defined in the contracts as well, namely after the project ends.

Furthermore, if necessary, ethical questions can be addressed and discussed throughout the project, in the scientific committee meetings.

## 2.5 Open Access Publications

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Open access (OA) is the process of making research outputs available online to everyone, free of charge. When OA is adopted, materials can be reused through an open licence for copyright. OA can be applied to all forms of published research output, including peer-reviewed and non-peer-reviewed academic journal articles, conference papers, dissertations, theses, book chapters, monographs, research reports and images.

Horizon Europe policies strongly encourage that data should be of immediate open access and deposited in certified and/or trusted-community-recognised repositories (Section 2.7).

There are different models of OA publishing, but the two most popular are the Golden and Green OA [10,11]:

- Golden OA. The publisher makes articles and related content available for free immediately on the journal's website. On the other hand, authors must pay a publication fee known as APC (article processing charge). However, under the Horizon Europe programme, publication fees in full open access venues are reimbursed. In such publications, articles are licensed for sharing and reuse via Creative Commons licences or similar.
- Green OA. Self-archiving by authors is permitted under green OA. Independently from publication by a publisher, the author also posts the work to a website controlled by the author, the research institution that funded or hosted the work, or to an independent central open repository, where people can download the work without paying. Green OA is free for the author.

## 2.6 Licences

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A licence is a legal arrangement between the creator of some artifact and the end-user that defines what users can do with the artifact. There are different types of licences for publications, software, datasets and others. Licences allow to protect intellectual property and allow others to use, modify or create new artifacts. Horizon Europe requires that open data are licensed and shared in trusted and certified repositories, along with respective metadata.

### 2.6.1 Data and Publication Licences

---

The most commonly and widely used data and publication licences are the suite of Creative Commons (CC) copyright licences [12]. CC licences are irrevocable, meaning that once one receives material under a CC licence, will always have the right to use it under those licence terms. If the licensor stops distributing the material under the CC licence terms, the end-user is not obliged to stop using it.

Next follows a list of the common types of data licences defined according to the Creative Commons scheme [12]:

- **Attribution (CC BY):** This licence lets others distribute, remix, tweak, and build upon your work, even commercially, if they credit the author for the original creation. This is the most accommodating of licences offered. Recommended for maximum dissemination and use of licensed materials.
- **Attribution (CC BY-SA):** This licence lets others remix, tweak, and build upon your work even for commercial purposes if they credit the author and license their new creations under identical terms. This licence is often compared to “copyleft” free and open-source software licences. All new works based on the licensed ones will carry the same licence, so any derivatives will also allow commercial use.
- **Attribution NoDerivatives (CC BY-ND):** This licence lets others reuse the work for any purpose, including commercially. However, it cannot be shared with others in adapted form, and credit must be provided to the author.
- **Attribution NonCommercial (CC BY-NC):** This licence lets others remix, tweak, and build upon your work non-commercially, and although their new works must also acknowledge the author and be non-commercial, they don’t have to license their derivative works on the same terms.
- **Attribution NonCommercial-ShareAlike (CC BY-NC-SA):** This licence lets others remix, tweak, and build upon your work non-commercially, if they credit the author and license their new creations under identical terms.
- **Attribution NonCommercial-NoDerivatives (CC BY-NC-ND):** This licence is the most restrictive of these six main licences, only allowing others to download works and share them with others as long as they credit the author, but they can’t change them in any way or use them commercially.
- **Attribution (CC 0):** This is a public dedication tool, allowing others to distribute, remix, adapt, and build upon the material with no limitations.

Horizon Europe policies recommend that scientific peer-reviewed publications and book chapters are published under the latest available version of the Creative Commons Attribution International Public Licence (CC BY, now the CC BY 4.0) and long-text formats under CC BY, CC BY-NC, CC BY-ND, CC BY-NC-ND or a licence with equivalent rights [2]. Furthermore, it is required that metadata is also licensed under a CC 0 or equivalent [2].

## 2.6.2 Software Licences

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Software should be licensed under appropriate software licences. A list of software licences is given in [13, 14]. Software licences can be categorized into three types: proprietary, free and open source, and hybrid [15]. Free and open source can be licensed based on permissive (e.g., Berkeley Software Distribution (BSD), Massachusetts Institute of Technology (MIT), Apache) or copyleft (e.g., GNU General Public License (GPL), GNU Lesser General Public License (LGPL), Mozilla) models [16].

Software licences allow third parties to use software for free with their own data, setting up restrictions about what end-users can and cannot do. If software is not licensed it cannot legally be used. Software metadata should also be licensed to establish mechanisms on how the software is referenced.

## 2.7 Repositories for Research Data

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Research data repositories are large data infrastructures that allow to manage, share, access, and archive datasets and scientific publications. The Horizon Europe programme strongly recommends

that open data is shared through trusted and/or certified repositories and offers a list of recommended repositories [17].

The EV4EU consortium decided to use the Zenodo general-purpose research repository for data and publications, and GitHub for source code (see Section 3.4).

Zenodo, developed under the European OpenAIRE program and operated by CERN, allows researchers to easily share and receive credit for their citable research results without requirements on specific data types and formats, size and licences. Zenodo also allows to save closed and restricted content that can be made publicly available later<sup>1</sup>.

GitHub is an Internet hosting service for software development, with more than 330 million repositories. It allows to build, scale, collaborate on codes and deliver software, in a secure way<sup>2</sup>.

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<sup>1</sup> <https://about.zenodo.org/>

<sup>2</sup> <https://github.com>



## 3 Data Management Plan

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This DMP report is supported and complemented by the Data Definition Catalogue (DDC) that is available in the EV4EU SharePoint and will be maintained by the Project Manager (PM). The DDC is an Excel file that supports a consistent and systematic definition of all the deliverables and data elements used (input) and /or produced (output) in the scope of the project. Deliverables are the formal reports that summarize the main results of the project WPs. Data elements are other elements used or generated in the project during the research activities.

### 3.1 Data Summary

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#### 3.1.1 Data Types

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The data used or produced in the scope of the EV4EU project is classified according to the following general categories:

**Deliverables** – Formal reports produced in the scope of the project and assigned to WPs. These reports are submitted by the PM/Coordination Team to the EC portal and formally approved by the EC project officer. Deliverables that have been submitted and approved shall be kept and shared in the project EV4EU website and CORDIS website (EC Site).

**Data Elements** – Formal or informal elements produced in the scope of the project. Those elements are identified, managed and even shared or reused by the partners or, when open, by target groups. These data elements include:

- **Publications:** book, book chapter, conference paper, journal article, patent, preprint, report, thesis, technical note, working paper. Research papers are the ones submitted to conferences and journals, peer-reviewed scientific papers are the ones that underwent peer-review process by peers and pre-prints are research papers not yet submitted or accepted by journals or conferences but available in arXiv or Zenodo.
- **Software:** A set of source code and technical documentation files, usually managed in a source code repository that supports version control and other software development tools, such as file hosting, bug tracking and issue tracking.
- **Datasets:** datasets are collections of data obtained from the research activities in the form of numerical data or text in the case, for instance, of questionnaires.
- **Other:** other types of resources that may be produced and shared are posters, videos, images, and presentations.

#### 3.1.2 Data Sources

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The data used and generated in the EV4EU project will be obtained from different sources. Whenever possible, the EV4EU consortium will re-use data from public databases or partners. EV4EU will also generate new data in the demonstration sites to analyse the solutions and management strategies proposed in the project. As for now, these are the main data sources planned:

- **Publicly available databases:**
  - Public databases on electric vehicle stocks and sales, number of charging points, electric vehicle battery demand, and electricity demand available worldwide, in Europe and specifically for each country where the demonstrations will occur to define the electric road mobility scenarios.
  - Literature review and corresponding open data.
- **Data manually collected:**

- Data about the consortium (names, emails, role, institution). This database will be restricted to the consortium members.
- Dataset on meetings, workshops, any kind of event that EV4EU has participated, scientific publications, and media news. This dataset is restricted to the consortium members and EC.
- Questionnaires developed under WP3 on how people behave and what are their experiences with Vehicle-to-Grid (V2G) and Electric Vehicle (EV) charging. These data will provide the information needed to address the EV user types and respective needs with the Vehicle-to-Everything (V2X) solutions to be developed.
- Market surveys.
- Feedback from participants.
- Data automatically collected through technology:
  - Data generated in the demonstration sites located in Portugal, Slovenia, Denmark and Greece, during the execution of the project under WP6, WP7, WP8 and WP9 (e.g., data on energy consumption, time of charging).
  - Available data generated by partners, mainly Distribution Service Operators (DSOs), concerning the time of EV charging, period of the day of charging, charging consumption and energy consumed.
  - Available data allowed from relevant projects such as ACDC<sup>3</sup> and OneNET<sup>4</sup> project.

Additional sources may be considered during the project and will be referred to in the DMP updates throughout the project.

### 3.1.3 Data Formats

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Open data formats will be used when possible. The format files expected to be used throughout the project include:

- Documents, deliverables, publications: .doc/.pdf
- Databases on energy consumption, charging hours: .csv
- Spreadsheets: .xlsx
- Images from demonstration sites: .jpg
- Videos from demonstration sites: .avi, .mp4

As example, data from the questionnaires can be stored as written files or spreadsheets (.txt, .doc, pdf, .xlsx). Numeric data from the demonstration sites can be stored in databases .csv (automatic data). Images from the demonstration activities can be stored as .jpg or Tagged Image Format (.tif) and videos as .avi and .mp4 files.

### 3.1.4 Data Storage

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Relevant datasets will be shared among partners and stored in the EV4EU internal SharePoint for up to 5 years after the project conclusion. Each dataset will have the following associated metadata:

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<sup>3</sup> Autonomously Controlled Distributed Chargers (ACDC) project ([www.acdc-bornholm.eu](http://www.acdc-bornholm.eu))

<sup>4</sup> OneNet- One Network for Europe European Union's Horizon H2020 project ([www.onenet-project.eu](http://www.onenet-project.eu))

project acronym, grant number, WP number, Task leader, file name, version, date, file type, DOI description, access and licensing information, associated publications, keywords.

Public deliverables will be stored in the public project website and in the ECSite.

Scientific publications will be stored in the website.

Open databases will be stored in the Zenodo repository. EV4EU has a community in Zenodo following the link: <https://zenodo.org/communities/ev4eu/>.

### 3.1.5 Data Size

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We will estimate the size of the databases during the execution of the project, taking attention to the limitations of size imposed by our organizations.

### 3.1.6 Data Utility

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The data produced in this project will be used by the EV4EU consortium and will also be useful to a variety of stakeholders, from scientific researchers to aggregators, system operators, and authorities.

## 3.2 FAIR Data

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The EV4EU project will always maximize access and re-use of EV4EU data while maintaining some closed data protected for patenting. Thus, EV4EU will follow the FAIR Data principles to make open data findable, including provisions for metadata (Section 3.2.1), accessible (Section 3.2.2), interoperable (Section 3.2.3) and re-usable (Section 3.2.4).

### 3.2.1 Making Data Findable, including Provisions for Metadata

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Our strategies to make data more findable are:

- Data uploaded to the EV4EU community in Zenodo will be linked to the European Commission Funded Research (OpenAIRE) community.
- All data uploaded to Zenodo will be associated with a persistent identifier, the digital object identifier (DOI).
- Data uploaded in Zenodo will be enriched with metadata to facilitate discovery. The metadata will include information regarding the data, mainly the Grant Number, Project Acronym, WP number, Task leader, file name, version, date, file type, DOI, description, access and licensing info, associated publications, keywords.
- Keywords associated with metadata will be descriptive. A set of general keywords provided are Electric Vehicles, V2X Management, User-centric management, Distribution Networks, Power Systems, and Smart Cities.
- All files will have a consistent name:

```
<ProjectAcronym>_<FileType>_WP<WPId>_T<TaskId>_<Description>_<LastUpdateDate>_V.<version>
```

```
<ProjectAcronym> := "EV4EU"
```

```
<FileType> := "DB" (Database), "DEL" (Deliverable), "SP" (Scientific publication), "R" (Report), "I" (Images)
```

<WPId> := “1”to “11”

### 3.2.2 Making Data Accessible

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As mentioned previously, all EV4EU public data will be deposited in trusted repositories according to the directives of the Horizon Europe programme [1]. EV4EU open data will be stored in Zenodo, which will include mainly data concerning scientific publications, deliverables, and datasets. Furthermore, the data will also be stored in other key systems provided below, managed by the participants in a decentralized way:

- **Project Public Website (WebSite)** (<https://ev4eu.eu>) implemented as a customized WordPress instance. This system will manage and provide both public and controlled access to the data for five years.
- **Project Private Repository (PrivRep)**, available as a Microsoft Teams and SharePoint instance: This system shall be used to share general documents and templates for internal use by the participants, databases that are being processed and shared among partners, data that are not publicly accessible and respective metadata.
- **Project Open Data Repository (DataRep)**, available as a **Zenodo project community** (<https://zenodo.org/communities/ev4eu/>). This is the recommended system to manage and share the final versions of public data elements such as datasets, videos, images, and presentations, as well as references/citations to open publications and software repositories.
- **Project Code Repository (CodeRep)**, available as a **GitHub organization** (<https://github.com/EV4EU>). This is the recommended system to manage the software that will be shared internally with the project’s participants and publicly shared.
- **Journal and Conference Publishers Sites (PublisherSite)**: These are the specific sites of the publishers that publish peer-reviewed papers (submitted by the project’s participants), which present the main scientific results of the project.
- **Project Site at EC CORDIS (ECSite)**, available at <https://cordis.europa.eu/project/id/101056765>: The Community Research and Development Information Service (CORDIS) is the European Commission's primary source of results from the projects funded by the EU's framework programmes for research and innovation, from FP1 to Horizon Europe. This is the project micro-site defined and managed in the scope of the EC CORDIS.

The datasets identified by the scientific committee as IPR protected for patenting will not be open access, instead, they will be stored in internal private and institutional repositories.

### 3.2.3 Making Data Interoperable

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As mentioned previously, the EV4EU consortium will use open file formats whenever possible, and standardized metadata to describe the data. Further information on how to make data interoperable, especially concerning metadata, metadata vocabularies, standards, formats or methodology to follow, will be described in subsequent versions of the DMP.

### 3.2.4 Making Data Re-usable

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Following the principle of “*as open as possible, as closed as necessary*”, EV4EU partners will enable third parties to access, mine, exploit, reproduce and disseminate all public data sets with Creative Commons Licences. Open software will be made available through free software licences.

Data published in scientific journals will be made available as soon as the paper is published, shared through Zenodo or/and as a preprint through arXiv.org or university repositories.

Data associated with public deliverables or scientific papers will be shared as soon as the document is approved by the EC or journal through Zenodo.

All non-anonymous data, if exists, will be deleted when the project finishes (e.g., data obtained from the “contact us” session on the website, containing names, emails and messages).

### 3.3 Other Research Outputs

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As mentioned before, EV4EU will generate not only datasets, scientific articles, books, and deliverables, but also software, tools and models. The FAIR principles described for public data will also apply to public software and models.

### 3.4 Allocation of Resources

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EV4EU will use free-of-charge research data repositories (Zenodo, GitHub, website, Cordis) to make EV4EU public data open and FAIR. Data management will be the responsibility of INESC-ID (Data Manager and Project Manager), with the support of the WP leaders that will ensure that datasets are in accordance with the guidelines.

### 3.5 Data Security

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All documents including confidential data related to EV4EU are shared among the consortium via EV4EU SharePoint. Only EV4EU members can access the EV4EU SharePoint after being granted access to the folder.

All public data and software will be stored in Zenodo and GitHub respectively, which also have several measures for security.

### 3.6 Organizations and Roles

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The project has the direct and indirect participation of several stakeholders, including *(i)* participant partners (organizations directly participating and beneficiaries of the project); *(ii)* associated partners (organizations that formally manifested interest in the project’s results); *(iii)* EC project funder; *(iv)* people associated with these organizations; and *(v)* target groups that have been identified in D10.1 [18], which are people and organizations that have interest in the project’s results.

From all these stakeholders, the DMP identifies the following organization roles that have the most direct impact on the responsibilities regarding project data management:

- Project Coordinator (PC)
- Project Manager (PM)
- Partners: EV4EU consortium includes 16 participant partners and 6 associated partners.
- WP Leader (WPLLeader)
- Task Leader (TaskLeader)
- General Assembly: PC, PM and one representative per partner.

- Scientific Committee: Work package leaders, PC and PM.
- Project Management Committee: PC, PM, innovation manager and communication officer.
- DMP Leader (DMPLeader)
- Correspondence Author (CAuthor), the author responsible for submitting a publication to a conference or journal (usually the first or last author).

### 3.7 Workflow to Define and Manage the DMP

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The workflow to define and manage the DMP involves the following activities that shall be performed throughout the project lifecycle:

A1. (M1-M6; DMPLeader, PC, PM): Define and publish the DMP, version 1.0; This shall include the definition and design of the DDC (as an Excel file).

A2. (M1-M6; PM with additional support): Create and setup the key supported systems, namely: project WebSite, PrivRep, DataRep, CodeRep, and ECSite.

**A3. (M6; PC, PM): Submit for approval by EC the DMP version 1.0.**

A4. (M7-M8; PC, PM): Distribute DMP version 1.0 and collect feedback from partners. Collect details concerning the identification of planned data elements.

A5. (M8-M9; DMPLeader, PC, PM): Refine and publish the DMP version 2.0 based on the feedback and input received from partners and other stakeholders.

**A6. (M9; PM): Submit for approval by EC the DMP version 2.0.**

A7. (M10-M34; PM): Continuous monitoring the right use and application of the DMP. Continuous update of the DMP, if necessary.

A8. (M34-M36; DMPLeader, PM, PC): Refine and publish the DMP updated (D11.2); this final version of the DMP shall show the learned lessons and the final version of the Data Definition Catalogue with the exhaustive list of the main results of the project.

**A9. (M36; PM) Submit for approval by EC the DMP updated.**

### 3.8 Rules

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To be aligned with the DMP, project partners must follow the following rules or recommendations concerning the production, publishing and sharing of different data types.

#### 3.8.1 Deliverables

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By default, approved deliverables shall be published as open access in EC Portal. If not, reasons shall be stated.

R.Deliverable.A.1 (Partners): Produce project deliverable with the tools and environments decided by the partners involved (e.g., based on a cloud file system like Teams).

R.Deliverable.A.2 (TaskLeader): One month before the deadline, submit the deliverable for internal review (in PDF and DOC formats), in PrivRep.

R.Deliverable.A.3 (PM): At the deadline, submit the deliverable for approval by EC, in EC Portal.

R.Deliverable.A.4 (PM): After approval by EC, publish the deliverable (PDF format) in the WebSite.

### 3.8.2 Publications

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By default, accepted publications shall be published as open access. If not, reasons shall be stated.

R.Publication.A.1 (Partners): Produce publication (with the tools and environments decided by the partners involved, e.g., based on a cloud file system like Google Drive, OneDrive).

R.Publication.A.2 (CAuthor): Submit the publication to a journal, conference or other organization.

R.Publication.A.3 (CAuthor): If publication is accepted, prepare and submit the proof revision. Publication published in PublisherSite.

R.Publication.A.4 (CAuthor): If publication accepted and published, send information to PM. The PM will then register reference/citation in WebSite.

R.Publication.A.5 (CAuthor): If publication is not accepted or not yet published, and if relevant, prepare and submit a preprint with ArXiv on DataRep. Ask to register that reference/citation in WebSite.

R.Publication.A.6 (PM): Register that reference/citation in WebSite.

### 3.8.3 Datasets

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Research datasets can be published according to different access rights (e.g., Open, Closed, Restricted, or Embargoed) and licensing schemes to support a balance between IPR and business interests with data openness, transparency, and reusability principles.

R.Dataset.A.1 (Partners): Produce a dataset with the tools and environments decided by the partners involved.

R.Dataset.A.1a (WPLLeader or TaskLeader): If the dataset involves personal data take in consideration privacy and personal data regulations, namely GDPR. Ask and manage users consents. Request additional support from PM if necessary.

R.Dataset.A.2 (TaskLeader): Submit the dataset in the DataRep, stating what is the access right and licence schema. Complement the dataset description with additional metadata as supported by the chosen DataRep.

R.Dataset.A.3 (TaskLeader): Send information to PM. The PM will keep the records of the dataset and will publish it in the WebSite.

### 3.8.4 Software Code

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Software code can be published according to different access rights (e.g., Open, Closed, Restricted, or Embargoed) and licensing schemes to support a reasonable balance between IPR and business interests with openness, transparency and reusability principles.

R.Software.A.1 (Partners): Produce a software tool or application (with the tools and computational environments decided by the partners involved). As a good practice of collaborative development, create and setup a public or private code repository in the CodeRep. Define and publish the software licence that would be most suitable for the situation.

R.Software.A.2 (Partners): Produce technical documentation that can be useful to the software's end-users and developers and add this documentation to the CodeRep.

R.Software.A.3 (TaskLeader): If the code repository is defined as public and has an associated dataset, create a link and reference/citation to it in the DataRep. Ask to register that reference/citation on the WebSite.

R.Software.A.4 (PM): If asked for, add that citation to the project WebSite and keep the records.

### 3.8.5 Other Data Elements

Data elements like videos, images or presentations shall be managed directly by the partners involved in their preparation and production. In general, these data elements shall be managed at the PrivRep (Project Private Repository) and the partner’s repositories.

However, if considered relevant to be formally registered and preserved, these data elements can be submitted in the DataRep and their references register on the project WebSite.

## 3.9 Deliverables

EV4EU will produce 61 deliverables, of which 51 are publicly available. Table 1 lists all project deliverables. The complete list of their classification and additional information is available in the companion “Data Definition Catalogue”.

**Table 1 – EV4EU deliverable list**

WP No	Deliverable			Dissem. Level
	No	Name	Type	
WP1	D1.1	Electric Road Mobility Evolution Scenarios	R	PU
WP1	D1.2	Impact of V2X in energy and power systems	R	PU
WP1	D1.3	Regulatory opportunities and barriers for V2X deployment in Europe	R	PU
WP1	D1.4	Business models centred in the V2X value chain	R	PU
WP1	D1.5	V2X Use-cases repository	OTHER	PU
WP1	D1.6	Real-scale prototype of V2X management station	DEM	PU
WP1	D1.7	Patent of V2X management station	R	PU
WP1	D1.8	Characterization of Batteries degradation considering the participation in V2X services	R	PU
WP2	D2.1	Control strategies for V2X integration in houses	R	PU
WP2	D2.2	Control strategies for V2X integration in buildings	R	PU
WP2	D2.3	Optimal management of V2X in parking lots	R	PU
WP2	D2.4	Optimal management of EV fleets in companies	R	PU
WP2	D2.5	Optimal management of V2X in energy communities	R	PU
WP2	D2.6	Control strategies for the optimal operation of electrified road freight and public transport	R	PU
WP3	D3.1	EV Users' Needs and Concerns - Preliminary Report	R	PU
WP3	D3.2	Apps and Tools design principals promoting EVs and V2X adoption	R	PU
WP3	D3.3	EVs use Clustering results report	R	PU
WP3	D3.4	V2X management Co-simulation platform	Software	PU



WP3	D3.5	V2X management at city level: Simulation results	R	PU
WP3	D3.6	Decision support tool for high-level coordination of V2X management strategies	R	PU
WP3	D3.7	EV users Needs and Concerns - Demonstrators' experience	R	PU
WP4	D4.1	Distribution network planning strategies considering V2X flexibilities	R	PU
WP4	D4.2	Scheduling and real-time operation strategies to control V2X flexibilities	R	PU
WP4	D4.3	Optimal management of V2X flexibilities integrated into a VPP portfolio	OTHER	PU
WP4	D4.4	Impact of mass deployment of V2X in energy markets and services	R	PU
WP4	D4.5	DR programs creating incentives for V2X	R	PU
WP5	D5.1	Information Exchange needs to enable different UCs	R	PU
WP5	D5.2	Standardisation gap analysis for new V2X related Business Models	R	PU
WP5	D5.3	High-Level Design of O-V2X-PM	R	PU
WP5	D5.4	Cyber-security and Privacy analysis for V2X services	R	PU
WP5	D5.5	Open V2X Management Platform	OTHER	PU
WP5	D5.6	APIs and APPs allowing V2X user interaction	OTHER	PU
WP6	D6.1	Implementation plan for the Azores demo	R	SEN
WP6	D6.2	Engagement activities report in Azores demo	R	PU
WP6	D6.3	Implementation, operation and monitoring of the Azores demo	DEM	SEN
WP6	D6.4	Evaluation and lessons learn of the Azores demo	R	PU
WP7	D7.1	Detailed definition and implementation plan of Slovenian Demonstrator	R	SEN
WP7	D7.2	Slovenian demo commissioning and start-up report	R	SEN
WP7	D7.3	Slovenian use cases demonstration, monitoring and evaluation report	DEM	PU
WP7	D7.4	Lessons learned in Slovenian Demonstrator and Services Marketability report	R	PU
WP8	D8.1	Use Case (UC) specifications and demonstrator deployment plan	R	SEN
WP8	D8.2	Greek demonstrator start-up report	R	SEN
WP8	D8.3	Open V2X Management Platform test report	DEM	PU
WP8	D8.4	Services Activation in Greek demonstration report	DEM	PU
WP8	D8.5	Analysis of demonstration results in Greek demonstration	R	SEN
WP8	D8.6	Lessons learned in Greek Demonstrator and Services/Tools Marketability report	R	PU
WP9	D9.1	Use case specification, development, installation, commissioning, demonstration, and evaluation planning for the Danish demo	R	SEN
WP9	D9.2	Danish demo commissioning and start-up report	DEM	SEN
WP9	D9.3	Operation log for the Danish demo	R	SEN
WP9	D9.4	Demonstration results report for the Danish demo	R	PU
WP9	D9.5	Lessons learned, impact and replicability potential assessment for the Danish demo	R	PU

WP10	D10.1	Plan for the dissemination and exploitation of results including communication activities	R	PU
WP10	D10.2	Plan for the dissemination and exploitation of results including communication activities - Update	R	PU
WP10	D10.3	Innovation Strategy	R	PU
WP10	D10.4	Innovation Strategy- Update	R	PU
WP10	D10.5	Exploitation Plan	R	PU
WP10	D10.6	Exploitation Plan - Update	R	PU
WP10	D10.7	Standardisation activities plan	R	PU
WP10	D10.8	Roadmap for the solutions enabling the mass deployment of EVs	R	PU
WP11	D11.1	Data Management Plan	R	PU
WP11	D11.2	Data Management Plan - Update	R	PU

## 4 Conclusions

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In this document, we have presented the DMP for the EV4EU project.

In line with the Horizon Europe policies, the DMP is key to making data open and FAIR. For this reason, the DMP consists of a set of guidelines for data management, that should be followed by all consortium partners, mainly the WP and Task Leaders and monitored by the PM and Data management. This plan will be updated on M36 (D11.2), or whenever relevant changes occur.

This DMP is accompanied by the Data Definition Catalogue which consists of a record of the EV4EU data elements that will be filled during the project execution.

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