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E-LOBSTER

Electric losses balancing through integrated storage and power electronics towards increased synergy between railways and electricity distribution networks

Deliverable D7.2
Data Management Plan

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1   Introduction

The main objective of the E-LOBSTER project is to develop and demonstrate up to TRL 6 in relevant environment (a real underground railway in Madrid connected to a local power distribution network with a high penetration of RES) an innovative, economically viable and easily replicable Electric Transport-Grid Inter-Connection System that properly managed will be able to establish mutual synergies between power distribution networks, electrified urban transport networks (metro, trams, light railways etc.) and charging stations for electric vehicles.

In particular, E-LOBSTER will demonstrate tools and technologies, software and hardware to monitor in real time the source of losses of both the networks (Transport and distribution networks (DN)) prioritising techniques for their minimisation via a coordinated control of the power supply for electrified transport and recharge stations for electric cars and towards the maximisation of the local consumption of Renewable Energy Sources (RES) production thanks to the use of Electrical Energy Storage (EES) and advanced power electronics devices.

In this context, this deliverable, developed in the framework of WP7 "Management and coordination" represents the Data Management Plan.

The scope of this Data Management Plan is to describe the data management life cycle for the data to be collected, processed and/or created in the framework of the E-LOBSTER project.

Actually, the aim of the Data Management Plan is to consider the different aspects of data management since the beginning of the project to ensure that outcomes are well-managed in the present and prepared for preservation in the future.

In particular, this document specifies how the E-LOBSTER research data will be handled in the framework of the project as well as after its completion.

As a matter of fact, the report will indicate:

- what data will be collected, processed and/or created and from whom
- which data will be shared and which one will be maintained confidential
- how and where the data will be stored during the project
- which backup strategy will be applied for safely maintaining the data
- how the data will be preserved after the end of the project

The present Data Management Plan has to be considered as a living document, and any future update or change in the E-LOBSTER data management policy will be included in the periodic reports or will be specified in the deliverables related to the specific tasks.

In particular, the Data Management Plan will be refined according to the IPR strategy that will be defined for the E-LOBSTER exploitable results. Actually, the Consortium includes industrial partners aiming to develop innovative products and services through the project research and in this context, a proper management of the data generated is key in order do not jeopardize the results in a high competitive market.

2 Research data

Generally speaking, research data refers to data collected, processed, observed, or generated within a project with the aim to produce original research results. Data are processed, organized, structured and interpreted in order to determine their true meaning and becoming in this way valuable information.

In the framework of research activities, data can be divided into different categories, depending on their scope, their origin as well as their processing.

For instance, very often research data are classified in:

- Observational data
- Experimental data
- Simulation data
- Derived data

Actually, observational data refers to data captured in real-time (e.g. sensor data, survey data, sample data etc.), experimental data refers to data obtained from laboratory equipment (e.g data resulting from validation in the field) whereas simulation data indicates data created from numerical models. Derived data are those data generated from existing data.

In this context, research data may include different formats:

- Text/word documents, spreadsheets, questionnaire, transcripts
- Laboratory/Field notebooks, diaries, codebook
- Audios, videos, pictures, photographs
- Test responses
- Slides
- Artifacts, specimen, samples
- Collection of digital objects acquired and generated during the research process
- Data files
- Database contents
- Protocols, procedures
- Models, algorithms, software codes, scripts, log files, simulations
- Methodologies and workflows
- Standard operating procedures and protocols
- Etc.

According to the key principles for research data management and in particular to the "*Guidelines on FAIR Data Management in Horizon 2020*", research data[1] must be *findable*, *accessible*, *interoperable*, *re-usable*. The FAIR data guiding principles are reported in the following[2]:

1. To be **Findable** any Data Object should be uniquely and persistently identifiable

   1.1. The same Data Object should be re-findable at any point in time, thus Data Objects should be **persistent**, with emphasis on their metadata

   1.2. A Data Object should minimally contain basic machine actionable metadata that allows it to be distinguished from other Data Objects

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[1] http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf

[2] https://www.force11.org/fairprinciples

1.3. Identifiers for any concept used in Data Objects should therefore be **Unique** and **Persistent**

2. Data is **Accessible** in that it can be always obtained by machines and humans
    2.1 Upon appropriate authorization
    2.2 Through a well-defined protocol
    2.3 Thus, machines and humans alike will be able to judge the actual accessibilty of each Data Object.

3. Data Objects can be **Interoperable** only if:
    3.1. (Meta) data is machine-actionable
    3.2. (Meta) data formats utilize shared vocabularies and/or ontologies
    3.3 (Meta) data within the Data Object should thus be both syntactically parseable and semantically machine-accessible

4. For Data Objects to be **Re-usable** additional criteria are:
    4.1 Data Objects should be compliant with principles 1-3
    4.2 (Meta) data should be sufficiently well-described and rich that it can be automatically (or with minimal human effort) linked or integrated, like-with-like, with other data sources
    4.3 Published Data Objects should refer to their sources with rich enough metadata and provenance to enable proper citation

After having investigated the aforementioned aspects, it was decided that the data management plan of E-LOBSTER will be based on some key elements[3]:

Dataset reference and name: An identifier has to be produced for each dataset. In particular, the technical data related to simulations, validation through laboratory tests, validation in the field (WP1, WP2, WP4, WP5) will be referred by using a code composed on the date (year, month, day, hour e.g. 20181101_0845) and a name.

Data set description: The data that will be generated or collected during E-LOBSTER will be described, as well as their origin (in case they are collected). A readme.txt file will allow to have the basic information.

Standards and metadata: Reference to existing suitable standards of the discipline. If these do not exist, an outline on how and what metadata will be created has to be given.

Data sharing: Description of how data will be shared, including access procedures, embargo periods (if any) will be provided. In case the dataset cannot be shared, the reasons for this should be mentioned (e.g. IPR, personal data, intellectual property, commercial, security-related).

Archiving and preservation (including storage and backup): Procedures that will be put in place for long-term preservation of the data will be described. Indication of how long the data should be preserved, what is its approximated end volume.

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[3] https://www.openaire.eu/opendatapilot

3 Open Access

3.1 Measures to provide Open Access to peer-reviewed scientific publications

Fully in line with the Grant Agreement, each E-LOBSTER beneficiary will ensure open access (free of charge online access for any user) to all peer-reviewed scientific publications relating to its results. In particular, it will:

1) as soon as possible and at the latest on publication, deposit a machine-readable electronic copy of the published version or final peer-reviewed manuscript accepted for publication in a repository for scientific publications;

Moreover, the E_LOBSTER beneficiary will aim to deposit at the same time the research data needed to validate the results presented in the deposited scientific publications.

2) ensure open access to the deposited publication — via the repository — at the latest:

- on publication, if an electronic version is available for free via the publisher, or
- within six months of publication in any other case.

3) ensure open access — via the repository — to the bibliographic metadata that identify the deposited publication.

The bibliographic metadata must be in a standard format and must include all of the following:

- European Union (EU)
- Horizon 2020
- Research and Innovation Action (RIA)
- E-LOBSTER
- Grant Agreement No 774392".
- the publication date
- the length of embargo period if applicable
- Information about the persistent identifier

3.2 Management of the Research Data generated and/or collected during the project

The E-LOBSTER project recognizes the value of regulating research data management issues. Accordingly, in line with the Grant Agreement, the beneficiaries will, to the extent possible, deposit the research data needed to validate the results presented in the deposited publications in a clear and transparent manner. However, they have opted, after a careful have, not to take part to the Pilot Action on Open Research Data. The reason for this is that data that will underlie the project's activities may be of sensitive nature and their protection could have a relevant importance to guarantee the commercial perspectives in particular of the industrial partners. These data will be put at the disposal of relevant consortium partners as well as to the member of the stakeholder groups after having signed a devoted Non-Disclosure-Agreement (NDA). However, they will not be disclosed (with the exception of some cases) in order to safeguard the legitimate interests of all involved entities.

In the following chapters, the data management plan at project level as well as the individual partner data management plan will be presented.

4 Data management plan at project level

In this chapter, an overview of the data management plan at project level will be presented.
In particular, in the table below for each E-LOBSTER WP, the following information will be provided:

- Number and name of the task
- Description of the data collected/generated at task level
- Partner owner of the data
- Format
- Confidential level.

More accurate information will be presented in the next chapter, where the data management plan at individual partner level will be illustrated.

Table 1: Overview of E-LOBSTER Data management plan at project level

Task	Description	Data	Owner(s)	Format	Confidential
WP1 Analysis of energy losses for fully integrated power distribution and transport networks					
T1.1:	Analysis of the energy losses within the traction chain and identification of measures for energy losses prevention	-Software code of the bespoke simulator for Energy losses evaluation -Dataset related to Metro of Madrid to be used for the analysis (MDM). -Dataset related to the outcomes of simulations on power losses with various feeding arrangement based on data of metro of Madrid -Different datasets related to simulations for the validation of the tool for the railway network - Modelling of the railway traction system	MDM, UOB	.xls, .dat, .mat, jpeg, .txt., .pdf, .docx, .ppt	Yes
T1.2	Analysis of the energy losses within the power distribution grid and identification of measures for energy losses prevention	-Dataset related to parameters monitoring of the power distribution network -Dataset related to Metro of Madrid to be used for the analysis (MDM). -Modelling and simulation of the power distribution networks and components -Software code of the smart Grid simulator	UNEW, RINA-C, MDM	.xls, .dat, .mat, jpeg, .txt., .pdf, .docx, .ppt	Yes
T1.3	Design of an advanced simulator for rail electrification systems fully integrated with the power distribution system via a SOP and a DC bus connection	-Software code of the advanced simulator -Dataset related to simulator -Combination and Modelling of both power distribution networks and railway networks - Control strategy of the sSOP	MDM, UOB, UNEW, TPS	.xls, .dat, .mat, jpeg, .txt., .docx, .pdf, .ppt	Yes
T1.4	Impact of consumer behaviour on network losses	- Data about analysis of consumer behaviour and tools for reduction of energy consumption	FFE, RINA-C, UOB, UNEW	.pdf, .docx	No

		-Data related to the analysis of market, socioeconomic, legal and institutional framework situations			

WP2 - Enabling technologies

Task	Description	Data	Owner(s)	Format	Confidential
T2.1	Electrified Transport and distribution network key elements and main specification towards reduction of losses	- Data related to the analysis of the current situations in terms of energy losses in the railway and power distribution networks, state of the art of most suitable technologies for the losses reduction (Handbook)	UOB, RINA-C, TPS, FFE,SPD,LIBAL, RSSB	.pdf, .docx	No
T2.2	Smart SOP (Soft Open Point) Power Electronics Specifications and interaction with smart metering	-Software code based on PLECS for the simulations of sSOP performance -Data related to the simulations of the sSOP -Specifications of the sSOP	TPS	.PLECS, .pdf, .dat, .mat, .docx	Yes
T2.3	Identification, design and development of the most suitable Electrical Storage for the mutual benefit interexchange of electricity	-Custom made software code based on C# language for the simulations of the storage system performance -Data related to the simulations of the storage system -Specifications of the storage system	LIBAL	C#, .dat, .mat, .pdf, .docx, .txt	Yes
T2.4	Design and development of Power Electronics prototypes	- Schema and design of the power electronic prototypes	TPS, LIBAL	.pdf, .docx, .vsd	Yes

WP3 Policy, regulation and standards

Task	Description	Data	Owner(s)	Format	Confidential
T3.1	Identification of standard operating parameters and definitions towards future marketability	-Repository gathering information on existing standards and their classification	RSSB, FFE, MDM, RINA-C, UITP	.pdf, .docx, .xls	No

Task	Description	Data	Owner(s)	Format	Confidential
T3.2	Policies for the support of the marketability of E-LOBSTER Solution	-Repository gathering information on existing policies and their classification - Data related to the three stakeholder workshops with the 2 Stakeholders Groups (DSOs and Transport manager) in close collaboration with WP6 (results of questionnaires, surveys, inputs etc).	RINA-C, RSSB, FFE, UITP	.pdf, .docx, .xls, .ppt, online survey	No
T3.3	E-LOBSTER Compliancy to Energy and Transport regulation	- Data related to the analysis of the compliancy with current regulations	RSSB, LIBAL, FFE	.pdf, .docx, .xls, .ppt,	No
T3.4	Standardization procedures towards E-LOBSTER marketability	- Data related to existing standards - Data related to gap to be covered	FFE, RSSB	.pdf, .docx, .xls, .ppt,	No
T3.5	Final proposals to unlock policies, standards and regulatory bottlenecks	-Proposals for future standards	RSSB, LIBAL, RINA-C	.pdf, .docx, .ppt,	No
T3.5	Best practices for the cyber security of transports and distribution network smart management systems	- Guidelines and check list for cyber-security of transports and distribution network smart management systems	RINA-C, RSSB, FFE, MDM)	.pdf, .docx, .xls, .ppt,	Yes

WP4 System integration – Measures and technologies for collaborative rail and electricity networks for losses reduction and mutual benefit interaction					
Task	**Description**	**Data**	**Owner(s)**	**Format**	**Confidential**
T4.1	Identification of correlations and all possible shared degrees-of-freedom between Railway Energy Network and Distribution Electricity Network	-Data related to the analysis of the global electric framework including constraints and degrees-of-freedom of both the railway electric grid (i.e. train scheduling, overtension related to the start/stop of trains etc.) and the distribution network electric grid (i.e. quality of the power, frequency level, traditional daily supply scheduling etc… -).	UOB, RINA-C, UNEW, UOB, MDM, RSSB, FFE	.pdf, .docx, .xls, .ppt,	No

Task	Description	Data	Owner(s)	Format	Confidential
T4.2	Reference Architecture for Operational R+G (Railway-to-grid) Management System	- Data and characterization of the different interfaces - Data related to Functional analysis - Schemas of Physical System Architecture and Interface Architecture - Data related to behavioral Architecture, concerning the system usability, applications and use cases	UNEW, RINAC, UOB, MDM, TPS	.pdf, .docx, .xls, .ppt,	Yes
T4.3	Operational R+G Management System	- Source code for the R+G Management system -Data related to the testing of the R+G Management system -Design of the R+G Management system - Algorithm related to the R+G Management system -Data related to Testing of R+G Management system	RINA-C, UNEW, UOB, MDM, TPS, LIBAL	.pdf, .docx, .xls, .ppt, .dat, .mat Format of the source code for the R+G to be still defined after the analysis of interfaces	Yes

WP5 - Demonstration and Validation of the E-LOBSTER					
Task	**Description**	**Data**	**Owner(s)**	**Format**	**Confidential**
T5.1	E-LOBSTER R+G Management real-time simulation and validation in Hardware-in-the Loop	- Dataset referred to the real-time testing in the in the Smart Grid UNEW Laboratory with physical/emulation platform	UNEW, MDM, TPS, UOB, FFE, LIBAL	.xls, .dat, .mat, jpeg, .txt., .docx, .pdf	Yes
T5.2	E-LOBSTER R+G Management and power electronics laboratory validation and testing at the Smart Grid Laboratory	-Dataset referred to the laboratory Validation in the Smart Grid UNEW Laboratory of the R+G Management and power electronics devices	UNEW, MDM, TPS, UOB, FFE, LIBAL	.xls, .dat, .mat, jpeg, .txt., .docx, .pdf	Yes
T5.3	Demonstration and field testing of the R+G Management	-Dataset referred to the Validation in the field in the Metro of Madrid of the R+G Management System and power	MDM, RINA-C, FFE, TPS, LIBAL	.xls, .dat, .mat, jpeg, .txt., .docx, .pdf, .ppt	Yes, with the except of Guidelines

Task	Description	Data	Owner(s)	Format	Confidential
		electronics devices as well as the overall E-LOBSTER concept -Guidelines and Best practices and measures for the installation of the selected technologies at pilot site			that are not confidential
T5.4	Step by Step Monitoring Process from TRL4 to TRL 6	- Data related to the monitoring of KPI	UOB, UNEW, FFE, MDM, RINA-C	.xls, docx, .pdf	Yes

WP6 Dissemination and Route for Replication					
Task	**Description**	**Data**	**Owner(s)**	**Format**	**Confidential**
T6.1	Scale up of the E-LOBSTER concept and preliminary replication design	- Data for replicability studies - Data related to cost benefit analysis for assessing replicability	RINA-C, FFE, TPS, LIBAL, MDM	.xls, docx, .pdf	No
T6.2	Business Model and Roadmap Towards TRL 9	- Data related to potential Business models and roadmaps	All partners	.xls, docx, .pdf, .ppt	Yes
T6.3	Dissemination Activities	- Dissemination materials in different forms (video, lefleat, website etc.)	All	.mp4, .jpeg, .pdf, .docx	No
T6.4	Stakeholders engagement for future marketability of E-LOBSTER concept	- Data related to the three stakeholder workshops with the 2 Stakeholders Groups (DSOs and Transport manager in close collaboration with WP3 (results of questionnaires, surveys, inputs etc).	RINA-C, RSSB, FFE, UITP	.pdf, .docx, .xls, .ppt, online survey	No
T6.5	Exploitation and IPR management	- Guidelines for IPR strategy - Market data with respect to the different exploitable results - Plans for exploitation	All partners	.docx, .pdf	Yes

5   Individual partner data management plan

In this chapter, the E-LOBSTER individual partner data management plan is presented. In particular, each partner was requested to fill the table illustrated in Figure 1, according to the following instructions:

- **NAME:** name data/metadata/dataset;
- **DESCRIPTION:** brief description of data/metadata/dataset;
- **CREATED:** each partner should indicate if data/metadata/dataset was (or will be) created during the project (Yes/No);
- **GATHERED:** each partner should indicate if data/metadata/dataset was (or will be) collected from other sources (Yes/No);
- **TYPE:** each partner should indicate the type of data/metadata/dataset selecting some of the following options (more than option is possible): Document, Video, Images, Source code/Software, Algorithm, Raw Data, Dissemination material, etc;
- **FORMAT:** each partner should indicate the file extension of data/metadata/dataset (.pdf, .xls, .mat, specific customized format etc) and if a description of the data is available for its use
- **SIZE:** each partner should indicate the file extension the file dimension of data/metadata/dataset (order of magnitude: KB, MB or GB);
- **OWNER**: the lead beneficiary of the specific data/metadata/dataset (or "external" if the owner is not part of E-LOBSTER consortium) has to be indicated;
- **DISSEMINATION LEVEL:** each partner should indicate the dissemination level of the specific data/metadata/dataset collected or created during the project, by selecting one of the followings: Confidential, Public, Consortium, etc;
- **REPOSITORY DURING THE PROJECT (FOR PRIVATE/PUBLIC ACCESS):** each partner should indicate the location of data/metadata/dataset collected or created during the project, by selecting among E-LOBSTER file repository (Nextcloud), open access repositories, partner repository (private cloud/ drop box/ internal area), etc;
- **BACK-UP FREQUENCY**: it refers to the frequency of updating data/metadata/dataset collected or created during the project (daily, monthly, yearly etc.)
- **REPOSITORY AFTER THE PROJECT:** the location of data/metadata/dataset collected or created during the project after its conclusion, by selecting among E-LOBSTER file repository (Nextcloud), open access repositories, partner repository (private cloud/ drop box/ internal area), etc;
- **PRESERVATION AFTER THE END OF THE PROJECT (IN YEARS)**: if data/metadata/dataset collected or created during the project will be maintained, each partner must define for how many years they will be available.

NAME	DESCRIPTION	CREATED	GATHERED	OWNER	TYPE	FORMAT	SIZE	DISSEMINATION LEVEL	REPOSITORY DURING THE PROJECT (FOR PRIVATE/PUBLIC ACCESS)	BACK-UP FREQUENCY	REPOSITORY AFTER THE PROJECT	PRESERVATION AFTER THE END OF THE PROJECT (IN YEARS)

Figure 1: Template for individual partner data management plan

5.1 RINA-C DATA MANAGEMENT PLAN

NAME	DESCRIPTION	CREATED	GATHERED	OWNER	TYPE	FORMAT	SIZE	DISSEMINATION LEVEL	REPOSITORY DURING THE PROJECT (FOR PRIVATE/PUBLIC ACCESS)	BACK-UP FREQUENCY	REPOSITORY AFTER THE PROJECT	PRESERVATION AFTER THE END OF THE PROJECT (IN YEARS)
Dataset - Monitoring data on power distribution network	This dataset includes monitoring data related to parameters of the power distribution network received from the local DSO	No	YES	RINA-C/ local DSO	Raw data	.dat, .xls	MB	Confidential	E-LOBSTER repository (Nextcloud), Internal RINA-C repository	weekly	E-LOBSTER repository (Nextcloud), Internal RINA-C repository	5 years
Dataset – Impact on consumers	Data including analysis of market, socioeconomic, legal and institutional framework situations and trends	NO	YES	RINA-C /FFE	Data, Documents and figures	.xls .pdf .jpeg	MB	Public	E-LOBSTER repository (Nextcloud), Internal RINA-C repository	weekly	E-LOBSTER repository (Nextcloud), Internal RINA-C repository	5 years
Data on energy losses in the railway and power distribution networks	Data related to the analysis of the current situations in terms of energy losses in the railway and power distribution networks (state of the art)	NO	YES	RINA-C	Data, Documents and figures	.xls .pdf .jpeg	MB	Public	E-LOBSTER repository (Nextcloud), Internal RINA-C repository	weekly	E-LOBSTER repository (Nextcloud), Internal RINA-C repository	5 years
R+ G Management System	Dataset including all the simulations carried out for the validation of the railway simulator tool	Yes	No	RINA-C	Source code/ Software	to be defined after the definition of the different interfaces	MB	Confidential	RINA private internal repository	daily	RINA private internal repository	Permanent

(WP1)												
Dataset – Validation of R+G Data Management System	Dataset related to testing of the R+G Data Management System	Yes	No	RINA-C	Raw data and Documents	to be defined	MB	Confidential	E-LOBSTER repository (Nextcloud), Internal RINA-C repository	weekly	E-LOBSTER repository (Nextcloud), Internal RINA-C repository	5 years
First stakeholder workshop - Transport Manager Stakeholder Group (SG)	Data related to the First stakeholder workshop: questionnaires, surveys, video, audio, documentation, dissemination material, minutes of workshop.	Yes	No	RINA- C, UITP, RSSB	Documents, video, audio, data, pictures	.pdf	GB	Consortium	E-LOBSTER repository (Nextcloud), Internal partner repository	weekly	E-LOBSTER repository (Nextcloud), Internal partner repository	5 years
Second stakeholder workshop - DSO Stakeholder Group (SG)	Data related to the second stakeholder workshop: questionnaires, surveys, video, audio, documentation, dissemination material, minutes of workshop.	Yes	No	RINA- C, UITP, RSSB	Document	.pdf	GB	Consortium	E-LOBSTER file repository (Nextcloud), Internal partner repository	weekly	E-LOBSTER file repository (Nextcloud), Internal partner repository	5 years
Joint Stakeholder Workshop – TM and DSO Stakeholder Group (SG)	Data related to the Final stakeholder workshop: questionnaires, surveys, video, audio, documentation, dissemination material, minutes of workshop.	Yes	No	RINA- C, UITP, RSSB	Document	.pdf	GB	Consortium	E-LOBSTER file repository (Nextcloud), Internal partner repository	weekly	E-LOBSTER file repository (Nextcloud), Internal partner repository	5 years

Dataset Standards	Data related to the analysis of current standards	No	Yes	Consortium	Document	.pdf	MB	Consortium	E-LOBSTER file repository (Nextcloud), Internal partner repository	weekly	E-LOBSTER file repository (Nextcloud), Internal partner repository	5 years
Dataset – Cost Benefit Analysis	Data related to the Cost Benefit Analysis for the replication of the E-LOBSTER concept	Yes	YES	RINA-C	Document, data	.pdf, .xls	MB	Public (document) Confidential (raw data)	E-LOBSTER file repository (Nextcloud), Internal partner repository	weekly	E-LOBSTER file repository (Nextcloud), Internal partner repository	5 years

5.2 TPS DATA MANAGEMENT PLAN

NAME	DESCRIPTION	CREATED	GATHERED	OWNER	TYPE	FORMAT	SIZE	DISSEMINATION LEVEL	REPOSITORY DURING THE PROJECT (FOR PRIVATE/PUBLIC ACCESS)	BACK-UP FREQUENCY	REPOSITORY AFTER THE PROJECT	PRESERVATION AFTER THE END OF THE PROJECT (IN YEARS)
Simulators	Simulator for testing sSOP	Yes	NO	TPS	Source code/Software	.PLECS	MB	Confidential	Partner repository	weekly	Partner repository	Permanent
Dataset on testing	Outcomes of the testing activities through simulator	Yes	No	TPS	Raw data and documents	.dat .pdf .xlsx	MB	Raw data confidential	Partner repository (raw data), Project Repository Nextcloud (documents)	weekly	Partner repository (raw data), Project Repository Nextcloud (documents)	At least 5 years
sSOP Design	schema and design of sSOP	Yes	No	TPS	Documents and figures	.jpg .pdf .vsd	MB	Confidential	Partner repository	weekly	Partner repository	Permanent
Dataset validation in UNEW Laboratory	Outcomes of the validation activities during the test in UNEW Smart Grid	Yes	No	TPS	Raw data and documents	.dat .pdf .doc	MB	Raw data confidential	Partner repository (raw data), Project Repository Nextcloud (documents)	weekly	Partner repository (raw data), Project Repository Nextcloud	At least 5 years

	Laboratory										(documents)	
Dataset validation in Metro of Madrid	Outcomes of the validation activities in the field in Metro of Madrid	Yes	No	TPS	Raw data and documents	.dat .pdf	MB	Raw data confidential	Partner repository (raw data), Project Repository Nextcloud (documents)	weekly	Partner repository (raw data), Project Repository Nextcloud (documents)	At least 5 years

5.3   RSSB DATA MANAGEMENT PLAN

NAME	DESCRIPTION	CREATED	GATHERED	OWNER	TYPE	FORMAT	SIZE	DISSEMINATION LEVEL	REPOSITORY DURING THE PROJECT (FOR PRIVATE/ PUBLIC ACCESS)	BACK-UP FREQUENCY	REPOSITORY AFTER THE PROJECT	PRESERVATION AFTER THE END OF THE PROJECT (IN YEARS)
First stakeholder workshop (Transport Manager SG)	Data related to the First stakeholder workshop: questionnaires, surveys, documents	Yes	No	Consortium	Document	.pdf	MB	Consortium	E-LOBSTER file repository (Nextcloud), Internal partner repository	weekly	E-LOBSTER file repository (Nextcloud), Internal partner repository	5 years
Second stakeholder workshop (DSO SG)	Data related to the Second stakeholder workshop: questionnaires, surveys, documentats	Yes	No	Consortium	Document	.pdf	MB	Consortium	E-LOBSTER file repository (Nextcloud), Internal partner repository	weekly	E-LOBSTER file repository (Nextcloud), Internal partner repository	5 years
Joint Stakeholder Workshop with both SG	Data related to the Second stakeholder workshop: questionnaires, surveys, documentats	Yes	No	Consortium	Document	.pdf	MB	Consortium	E-LOBSTER file repository (Nextcloud), Internal partner repository	weekly	E-LOBSTER file repository (Nextcloud), Internal partner repository	5 years

NAME	DESCRIPTION	CREATED	GATHERED	OWNER	TYPE	FORMAT	SIZE	DISSEMINATION LEVEL	REPOSITORY DURING THE PROJECT (FOR PRIVATE/PUBLIC ACCESS)	BACK-UP FREQUENCY	REPOSITORY AFTER THE PROJECT	PRESERVATION AFTER THE END OF THE PROJECT (IN YEARS)
Dataset Standards	Data related to the analysis of current standards	No	Yes	Consortium	Document	.pdf	MB	Consortium	E-LOBSTER file repository (Nextcloud), Internal partner repository	weekly	E-LOBSTER file repository (Nextcloud), Internal partner repository	5 years

5.4 UOB DATA MANAGEMENT PLAN

NAME	DESCRIPTION	CREATED	GATHERED	OWNER	TYPE	FORMAT	SIZE	DISSEMINATION LEVEL	REPOSITORY DURING THE PROJECT (FOR PRIVATE/PUBLIC ACCESS)	BACK-UP FREQUENCY	REPOSITORY AFTER THE PROJECT	PRESERVATION AFTER THE END OF THE PROJECT (IN YEARS)
Single and multi-train simulators	Bespoke simulator for Energy losses evaluation (WP1)	Yes	NO	UOB	Source code/ Software	.mat	MB	Confidential	Partner repository	monthly	Partner repository	Permanent
Madrid Metro Line 2 – train, route and power network data	These data is used for the simulation to study the energy losses (WP1, WP5)	Yes	No	Madrid Metro Line 2	Raw data Documents and figures	.xls .pdf	1160 KB	Raw data confidential	Partner repository Nextcloud project repository	monthly	Partner repository Nextcloud project repository	At least 5 years
Energy losses evaluation data	These are the simulation data based on Madrid Metro Line 2. The data describe the power losses with various feeding arrangement (WP1)	Yes	No	UOB	Raw data Documents and figures	.dat .mat .pdf	MB	Raw data confidential, Summing up of results public	Partner repository (raw data). Nextcloud project repository (document/presentation summing up the simulations)	monthly	Partner repository (raw data). Nextcloud project repository (document/presentation summing up the simulations)	At least 5 years

NAME	DESCRIPTION	CREATED	GATHERED	OWNER	TYPE	FORMAT	SIZE	DISSEMINATION LEVEL	REPOSITORY DURING THE PROJECT (FOR PRIVATE/PUBLIC ACCESS)	BACK-UP FREQUENCY	REPOSITORY AFTER THE PROJECT	PRESERVATION AFTER THE END OF THE PROJECT (IN YEARS)
Dataset for Single and multi-train simulator tool assessm.	Dataset including all the simulations carried out for the validation of the railway simulator tool (WP1)	Yes	No	UOB	Raw data Documents and figures	.dat .mat .pdf	MB	Raw data confidential, Summing up of results public	Partner repository (raw data). Nextcloud project repository (document/presentation summing up the simulations)	monthly	Partner repository (raw data). Nextcloud project repository (document/presentation summing up the simulations)	At least 5 years
Dataset for the integrated simulator tool assessm.	Dataset including all the simulations carried out for the testing of the integrated tool (WP1)	Yes	No	UOB, UNEW	Raw data Documents and figures	.dat .mat .pdf	MB	Raw data confidential, Summing up of results public	Partner repository (raw data). Nextcloud project repository (document/presentation summing up the simulations)	monthly	Partner repository (raw data). Nextcloud project repository (document/presentation summing up the simulations)	At least 5 years
Dataset of laboratory validation	Data related to the validation of the simulator in the UNEW Smart Grid Laboratory	Yes	No	UOB, UNEW	Raw data Documents and figures	.dat .mat .pdf	MB	Raw data confidential, Summing up of results public	Partner repository (raw data). Nextcloud project repository (document/presentation summing up the simulations)	monthly	Partner repository (raw data). Nextcloud project repository (document/presentation summing up the simulations)	At least 5 years

5.5 LIBAL DATA MANAGEMENT PLAN

NAME	DESCRIPTION	CREATED	GATHERED	OWNER	TYPE	FORMAT	SIZE	DISSEMINATION LEVEL	REPOSITORY DURING THE PROJECT (FOR PRIVATE/PUBLIC ACCESS)	BACK-UP FREQUENCY	REPOSITORY AFTER THE PROJECT	PRESERVATION AFTER THE END OF THE PROJECT (IN YEARS)
Simulators CELATORS	Custom made simulator for testing the electric storage systems	Yes	NO	LIBAL	Source code/Software	C, C#, .txt	MB	Confidential	Partner repository	weekly	Partner repository	Permanent

LIBAL Cloud	MS Azure Cloud data collection software	YES	NO	LIBAL	Source code/Software	N/A	MB	Confidential	Partner repository	Continuously	LIBAL	Permanent
Dataset on testing	Outcomes of the testing activities through simulator	Yes	No	LIBAL	Raw data and documents	.dat .pdf	MB	confidential	Partner repository (raw data), project Repository Nextcloud (documents)	weekly	Partner repository (raw data), project Repository Nextcloud (documents)	At least 5 years
Electric Storage System Design	Schema and design of Electric Storage Systems	Yes	No	LIBAL	Documents and figures	.jpg .pdf	MB	Confidential	Partner repository	weekly	Partner repository	Permanent
Dataset validation in UNEW Laboratory	Outcomes of the validation activities during the test in UNEW Smart Grid Laboratory	Yes	No	LIBAL	Raw data and documents	.dat .pdf	MB	Confidential	Partner repository (raw data), project Repository Nextcloud (documents)	weekly	Partner repository (raw data), project Repository Nextcloud (documents)	At least 5 years
Dataset validation in Metro of Madrid	Outcomes of the validation activities in the field in Metro of Madrid	Yes	No	LIBAL	Raw data and documents	.dat .pdf	MB	Raw data confidential	Partner repository (raw data), project Repository Nextcloud (documents)	weekly	Partner repository (raw data), project Repository Nextcloud (documents)	At least 5 years

5.6 MDM DATA MANAGEMENT PLAN

NAME	DESCRIPTION	CREATED	GATHERED	OWNER	TYPE	FORMAT	SIZE	DISSEMINATION LEVEL	REPOSITORY DURING THE PROJECT (FOR PRIVATE/PUBLIC ACCESS)	BACK-UP FREQUENCY	REPOSITORY AFTER THE PROJECT	PRESERVATION AFTER THE END OF THE PROJECT (IN YEARS)
MDM Data files from substation equipment	Recording data available from the different substation equipment to be used for simulations	Yes	No	MDM	Document, raw data	.xls	100 MB	Consortium	Internal partner repository, Project repository (Nextcloud)	weekly	Internal partner repository, Project repository (Nextcloud)	5
MDM Measurement data from the substation equipment	Real measurement from the substation equipment to be used for simulations	Yes	No	MDM	Document, raw data	.xls	10 MB	Consortium	Internal partner repository, Project repository (Nextcloud)	weekly	Internal partner repository, Project repository (Nextcloud)	5
MDM Installations	Photographs of different installations in MDM	Yes	No	MDM	Images	.jpg	100 MB	Consortium	Internal partner repository, Project repository (Nextcloud)	weekly	Internal partner repository, Project repository (Nextcloud)	5

5.7 UNEW DATA MANAGEMENT PLAN

NAME	DESCRIPTION	CREATED	GATHERED	OWNER	TYPE	FORMAT	SIZE	DISSEMINATION LEVEL	REPOSITORY DURING THE PROJECT (FOR PRIVATE/ PUBLIC ACCESS)	BACK-UP FREQUENCY	REPOSITORY AFTER THE PROJECT	PRESERVATION AFTER THE END OF THE PROJECT (IN YEARS)
Energy losses evaluation data on	These are the simulation data based on Madrid Metro	Yes	No	UNEW	Raw data Documents and figures	.dat .mat .xls .pdf	MB	Raw data confidential, Summing up of results public	UNEW repository (raw data). Nextcloud project repository	daily	UNEW repository (raw data). Nextcloud project repository	At least 5 years

Madrid Metro 12	Line 12. The data describe the load flow study results as part of the simulation study in T1.2								(document/presentation summing up the simulations)		(document/presentation summing up the simulations)	
Madrid Metro Line 12	This data is used for the simulation to study the energy losses (WP1, WP5)	Yes	No	MDM	Raw data Documents and figures	.xls .pdf	MB	Raw data confidential	Partner repository Nextcloud project repository	monthly	Partner repository Nextcloud project repository	At least 5 years
Dataset	WP5_demnstartion	Yes	Yes	UNEW	Experim.	.xls .pdf .mat	kB	confidential	Private cloud			
Smart Grid Simulator	Simulator for Energy losses evaluation (WP1)	Yes	No	UNEW	Source code/Software	.m .mat	MB	Confidential	UNEW internal repository	monthly	UNEW internal repository	Permanent
Dataset for the integrated simulator tool assessment	Dataset including all the simulations carried out for the testing of the integrated tool (WP1)	Yes	No	UOB, UNEW	Raw data Documents and figures	.dat .mat .xls .pdf	MB	Raw data confidential, Summing up of results public	UNEW repository (raw data). Nextcloud project repository (document/presentation summing up the simulations)	daily	UNEW repository (raw data). Nextcloud project repository (document/presentation summing up the simulations)	At least 5 years
Dataset of laboratory validation	Data related to the validation of the simulator in the UNEW Smart Grid Laboratory	Yes	No	UOB, UNEW	Raw data Documents and figures	.dat .mat .xls .pdf	MB	Raw data confidential, Summing up of results public	UNEW repository (raw data). Nextcloud project repository (document/presentation summing up the simulations)	daily	UNEW repository (raw data). Nextcloud project repository (document/presentation summing up the simulations)	At least 5 years

5.8 FFE DATA MANAGEMENT PLAN

NAME	DESCRIPTION	CREATED	GATHERED	OWNER	TYPE	FORMAT	SIZE	DISSEMINATION LEVEL	REPOSITORY DURING THE PROJECT (FOR PRIVATE/ PUBLIC ACCESS)	BACK-UP FREQUENCY	REPOSITORY AFTER THE PROJECT	PRESERVATION AFTER THE END OF THE PROJECT (IN YEARS)
Data of consumer consumption.	Analysis of consumer behavior. Information on consumptions and tools for reduction of energy consumption.	No	Y (from previous projects)	FFE	report	.doc	MB	Public-use	Nextcloud and partner Private-cloud	daily	Partner repository-Private cloud	10 years
Current operating standards	The document will describe the actual standards and analyse the specific national regulations. It will be done also a revision of the applicable standards.	N0	Y (From state of art)	FFE	report	.doc (most probable) or xlsl	MB	Public Use	Nextcloud and partner Private-cloud	daily	Partner repository-Private cloud	10 years
Workshop feedbacks	The document will delineate the results of Stakeholders' group workshops. It will be described the most relevant factors and it will be collected the evidence coming from this workshops and this activities	Yes	No	FFE	Docum ent (report)	.doc	MB	Consortium	Nextcloud and partner Private-cloud	daily	Partner repository-Private cloud	10 years

5.9 UITP DATA MANAGEMENT PLAN

NAME	DESCRIPTION	CREATED	GATHERED	OWNER	TYPE	FORMAT	SIZE	DISSEMINATION LEVEL	REPOSITORY DURING THE PROJECT (FOR PRIVATE/ PUBLIC ACCESS)	BACK-UP FREQUENCY	REPOSITORY AFTER THE PROJECT	PRESERVATION AFTER THE END OF THE PROJECT (IN YEARS)
Preliminary Stakeholder Workshop: E-LOBSTER Stakeholder Workshops No.1 Stakeholder Workshop on Electric PT – M13 – M36: Preliminary time Oct – Nov 2019	A preliminary workshop on Electric PT Stakeholder Group – Feedback from the workshop received in the forms of questionnaire surveys, meeting notes, documents	Yes	Yes	External	Text or word documents, spreadsheets questionnaire , transcripts, meeting minutes ; audiotapes, videotapes ; database contents ; publications, reports, dissemination materials	PDF	MB	Consortium	E-LOBSTER file repository (Nextcloud)	weekly	E-LOBSTER file repository (Nextcloud)	Maintained – 5 years
Preliminary Stakeholder Workshop: E-LOBSTER Stakeholder Workshops No.2 Stakeholder Workshop Electric Distribution	A preliminary workshop on Electric Distribution Network Operators and Tech Providers Stakeholder Group – Feedback	Yes	Yes	External	Text or word documents, spreadsheets questionnaire transcripts, meeting minutes ; audiotapes, videotapes ; database contents ;	PDF – descripti on available	MB	Consortium	E-LOBSTER file repository (Nextcloud)	weekly	E-LOBSTER file repository (Nextcloud)	Maintained – 5 years

Network Operators and Tech Providers) – M13 – M36: Preliminary time March – April 2020	from the workshop received in the forms of questionnaires, surveys, meeting notes, documents				publications, reports, dissemination materials							
Joint Stakeholder Workshop: E-LOBSTER Stakeholder Workshops No.3 Stakeholder Workshop Electric PT and Electric Distribution Network Operators and Tech Providers) – (M13 – M36): Preliminary time Feb – April 2021	A joint workshop on Electric PT and Electric Distribution Network Operators and Tech Providers Stakeholder Groups – Feedback from the workshop received in the forms of questionnaires, surveys, meeting notes, documentats	Yes	Yes	External	Text or word documents, spreadsheets ; questionnaires, transcripts, meeting minutes ; audiotapes, videotapes ; database contents ; publications, reports, dissemination materials	PDF – description available	MB	Consortium	E-LOBSTER file repository (Nextcloud)	Yearly (After the workshop organised and conducted)	E-LOBSTER file repository (Nextcloud)	Maintained – 5 years

6 Research Data Repositories

Although E-LOBSTER decided do not participate to the Pilot Action on Open Research Data in order do not hamper the commercial interests of the industrial partners, at this stage of the project, the E-LOBSTER consortium investigated about potential research data Repositories to be used for the sharing of no confidential data (e.g. papers).

Among the different possibilities, ZENODO (http://www.zenodo.org/) which is the cost free open access repository of OpenAIRE (the Open Access Infrastructure for Research in Europe, https://www.openaire.eu/) has been considered. OpenAIRE is an EC-funded initiative which aims to support the Open Access policy of the European Commission via a technical infrastructure. Actually, OpenAIRE has grown through a series of project phases funded by the European Commission[4]: from the DRIVER projects to link Europe's repository infrastructure, to the first OpenAIRE project aimed to assist the EC in implementing its initial pilot for Open Access (OA) to publications, and, through several further phases which have extended and consolidated the OpenAIRE mission to implement Open Science policies. OpenAIRE currently operates an interoperable and validated network of more than 520 repositories and OA journals (integrating more than 9 million OA publications and 1,000 datasets)

It has identified over 100,000 FP7 publications from about half the 26,000 FP7 projects, and offers literature-data integration services.

In particular, it is OpenAIRE platform, the technical infrastructure that is key for interconnecting the large-scale collections of research outputs across Europe. It creates workflows and services on top of this valuable repository content, which enable an interoperable network of repositories (via the adoption of common guidelines), and easy upload into an all-purpose repository (via ZENODO)[5].

Recently, the 29th of October 2018, OpenAIRE became a fully fledged organisation, with the formation of its legal entity, **OpenAIRE A.M.K.E.**, a non-profit partnership, to ensure a permanent presence and structure for a European-wide national policy and open scholarly communication infrastructure.

So far the objective of the OpenAIRE portal was to make as much European funded research output as possible available to all. Institutional repositories are typically linked to it. Furthermore, dedicated pages per project are visible on the OpenAIRE portal, making research output (publications, datasets or simple project information) accessible through the portal thanks to the bibliographic metadata linked to each publication.

Concerning ZENODO, the OpenAIRE project, as explained above, is in the vanguard of the open access and open data movements in Europe and was commissioned by the EC to support its Open Data policy by providing a catch-all repository for EC funded research. CERN (an OpenAIRE partner and pioneer in open source, open access and open data) provided this capability and ZENODO was launched in May 2013. In support of its research programme CERN has developed tools for Big Data management and extended Digital Library capabilities for Open Data. Through ZENODO these Big Science tools could be effectively shared in the research sector[6].

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[4] https://www.openaire.eu/openaire-history
[5] https://blogs.openaire.eu/?page_id=54
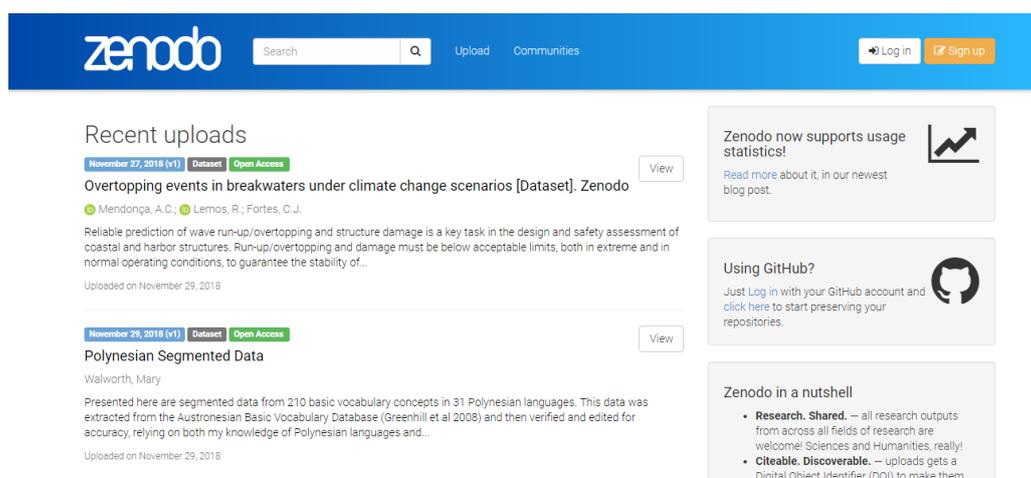[6] http://about.zenodo.org/

Figure 2: Home page of Zenodo

In addition to ZENODO, among the other repositories to be considered there is also re3data.org. re3data.org[7] is a global registry of research data repositories that covers research data repositories from different academic disciplines. It presents repositories for the permanent storage and access of data sets to researchers, funding bodies, publishers and scholarly institutions. re3data.org promotes a culture of sharing, increased access and better visibility of research data. The registry went live in autumn 2012 and is funded by the German Research Foundation (DFG). Project partners in re3data.org are the Berlin School of Library and Information Science at the Humboldt-Universität zu Berlin, the Library and Information Services department (LIS) of the GFZ German Research Centre for Geosciences, the KIT Library at the Karlsruhe Institute of Technology (KIT) and the Libraries of the Purdue University. The German partners are actively involved in the German Initiative for Network Information (DINI) and current research data management activities.
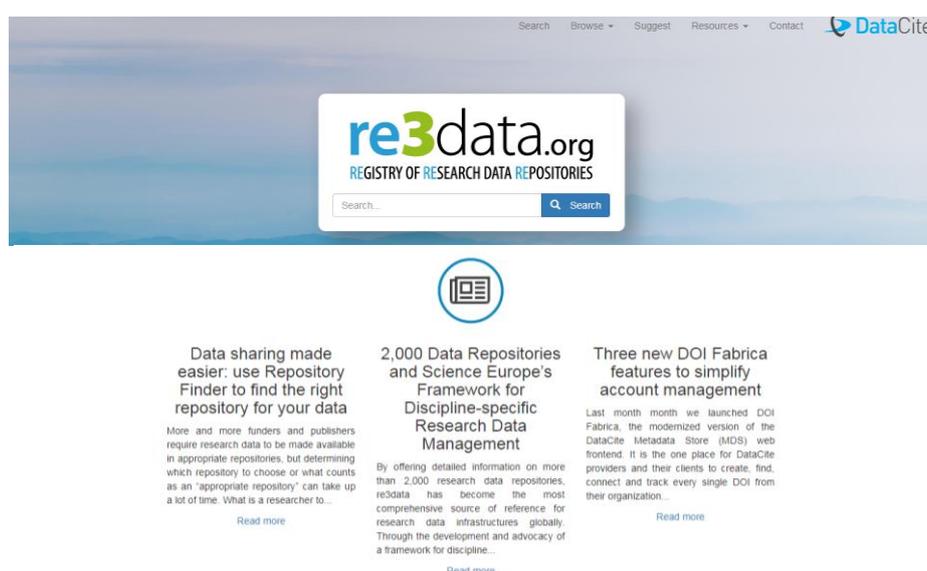

Figure 3: Home page of re3data.org

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[7] https://www.re3data.org/about

7 Conclusions

This deliverable represents the E-LOBSTER Data Management Plan at month 6. The scope of this Data Management Plan is to describe the data management life cycle for the data to be collected, processed and/or created in the framework of the E-LOBSTER project.

In particular, this document specifies how the E-LOBSTER research data will be handled in the framework of the project as well as after its completion.

More in detail, the report indicated:

- what data will be collected, processed and/or created and from whom
- which data will be shared and which one will be maintained confidential
- how and where the data will be stored during the project
- which backup strategy will be applied for safely maintaining the data
- how the data will be preserved after the end of the project

In particular, in the report both the data management plans at project and at individual partner level have been presented.

The present Data Management Plan has to be considered as a living document, and any future update or change in the E-LOBSTER data management policy will be included in the periodic reports or will be specified in the deliverables related to the specific tasks. In particular, the Data Management Plan will be refined according to the IPR strategy that will be defined for the E-LOBSTER exploitable results.