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Executive summary

The present document D8.2 “Data management plan (V1)” provides a plan for data management in the REFRESH project, taking into account the data collected, generated and/or used in the different WPs over the duration of the project. It has been developed in the framework of WP8 activities (“Project Management”) under the responsibility of the coordinator RINA-C.

The purpose of the present document is to establish the mechanisms to handle research data during and after the project, outlining a preliminary strategy for the management of the data generated in the framework of REFRESH project activities. Procedures for the management of research data, dataset description and scientific publication data will be addressed. The management policy will be defined fully in compliance with the open access principles adopted by the European Commission and enforced through the Grant Agreement.

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

The present deliverable is a living document and will be updated in M30 with the version D8.4 “Data Management Plan (V2)”, extending and improving the identified information or including new datasets not identified in the present document.

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List of acronyms

Acronym	Description
CA	Consortium Agreement
CO	Confidential
DoA	Description of Action
DMP	Data Management Plan
EC	European Commission
FAIR	Findability, Accessibility, Interoperability and Reusability
GA	Grant Agreement
GDPR	General Data Protection Regulation
H2020	Horizon 2020
HEU	Horizon Europe
IPR	Intellectual Property Rights
ORE	Open Research Europe
PM	Person Month
PU	Public
SoA	Scope of Action
TRL	Technology Readiness Level
ToC	Table of Contents
WP	Work Package

1 Introduction

The present document D8.2 “Data management plan (V1)” provides a plan for data management in the REFRESH project, taking into account the data collected, generated and/or used in the different WPs over the duration of the project. It has been developed in the framework of WP8 activities (“Project Management”) under the responsibility of the coordinator RINA-C.

The goal of the current publication is to provide an overview of an early data management strategy for the REFRESH project. The management of research data and publication data in scientific journals will be covered. The Grant Agreement as well as the Consortium Agreement will be used to enforce the management policy, which will be clearly specified in accordance with the open access guidelines set by the European Commission.

The project recognizes the value of regulating research data management issues.

Accordingly, in line with the rules laid down in the Model Grant Agreement, the beneficiaries will deposit the underlying research data needed to validate the results presented in the deposited scientific publications in a clear and transparent manner.

An overview on Open Access will be given and different repositories will be investigated in order to find the most appropriate modality for ensuring open access to discoverable data and scientific publications generated throughout the project lifecycle.

Even if project activities are at the beginning, a tentative description of the expected dataset generated will be carried out, trying to predict what data will be kept confidential and what data will be instead made available during project development.

2 Open Access

Open science is a synonym of Open Access, which can be defined as the practice of providing on-line free of charge access to scientific information related to project outcomes, which results in free access to information for everyone. In the context of R&D “scientific information” mainly refers to:

- peer-reviewed scientific research articles, if projects results are going to be disseminated in academic journals (as with REFRESH project);
- scientific research data, which includes any data related to project activities, both processed or raw.

Although there are no legally binding definitions of open access, authoritative definitions appear in key political declaration such as the 2002 Budapest Declaration and the 2003 Berlin Declaration. Under these definitions, “access” includes the right to read, download and print, but also to copy, distribute, search, link, crawl and mine the former data, provided that obligations to confidentiality, security and protection of personal data are ensured and the achievements of REFRESH objectives, including the future exploitability of results, are not jeopardized.

Open access is not a requirement to publish, but it is seen by the European Commission as an approach to facilitate and improve the circulation of information in the European research area and beyond. Open access to some data generated in projects funded by the European commission is the key to lower barriers to accessing publicly-funded research, as well as to demonstrate and share the potential of research activities supported with the help of public funding.

2.1 Open Science in Model Grant Agreement

The importance given by the European Commission to the open access issue is clearly outlined in the REFRESH Grant Agreement. Particularly, Article 29.2 states the responsibilities of beneficiaries and the actions to be undertaken to ensure open access to scientific publications and to research data respectively. The text of the articles is reported below.

Article 29.2: *Open access to scientific publications*

Each beneficiary must ensure open access (free of charge online access for any user) to all peer-reviewed scientific publications relating to its results.

In particular, it must:

(a) 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 beneficiary must aim to deposit at the same time the research data needed to validate the results presented in the deposited scientific publications.

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

(i) on publication, if an electronic version is available for free via the publisher, or

(ii) within six months of publication (twelve months for publications in the social sciences and humanities) in any other case.

(c) 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:

- the terms “European Union (EU)” and “Horizon 2020”;
- the name of the action, acronym and grant number;

- the publication date, and length of embargo period if applicable, and
- a persistent identifier.

This does not change the obligation to protect results in Article 27, the confidentiality obligations in Article 36, the security obligations in Article 37 or the obligations to protect personal data in Article 39, all of which still apply.

As an exception, the beneficiaries do not have to ensure open access to specific parts of their research data if the achievement of the action's main objective, as described in Annex 1, would be jeopardized by making those specific parts of the research data openly accessible. In this case, the data management plan must contain the reasons for not giving access.

The confidentiality aspects have been duly taken into account in the preparation of this document in order to not compromise the protection of project results and legitimate interests of project partners.

2.2 Open Science Practice in REFRESH project

To ensure an open cooperative work approach, as well as the exchange of knowledge, methodologies, model and tools developed, the REFRESH consortium will carry out different practices, following the HEU guidelines.

In line with the Horizon Europe open science policy transparent and open practices will be implemented in the REFRESH project, encouraging the use of the Open Research Europe (ORE) publishing platform and the open repository for research objects. Moreover, whenever possible and in line with Horizon Europe Open Access guidelines, dissemination material, presentations, publications and research datasets, as well as public project reports will be made available through the project website.

In addition, the consortium is committed to provide green open access wherever feasible. Green open-access ensures early and open sharing of results, allowing authors to deposit a Preprint, a potentially revised author version or a final peer-reviewed publisher's version of their publication at an institutional or subject repository that allows public access.

To increase and support REFRESH outputs dissemination and replicability:

- R&D partners will be available for interviews, to describe the models used for specific integration/assessment project activities;
- project outcomes will be shared in form of webinars, workshops, videos or articles;
- REFRESH will promote end-user and key stakeholders engagement.

Although all research activities within REFRESH project underlies on openness and transparency principles, it is important to note that details about prototype development won't be shared by responsible partners, due to industrial Intellectual Property protection.

3 Scientific Publications

As reported in the DoA, a dissemination and communication plan has been set up in order to raise awareness on the project outcomes among specialized audience. In this framework, the consortium commits itself to perform publications in peer reviewed international journals, in order to make the outcomes available to the scientific community. The partner in charge of dissemination activities are responsible for the scientific publications as well as for the selection of the publishers considered as more relevant for the subject matter.

Fully in line with the rules laid down in the REFRESH Grant Agreement and reported in section 2.1, each beneficiary will ensure open access to all peer reviewed scientific publications relating to its results.

The project will make use of a mix of the two different possibilities for open access eligible by the project, namely:

- *Open access publishing* (without author processing charges): partners may opt for publishing directly in open access journals, i.e. journals which provide open access immediately, by default without any charges;
- *Self-archiving/ “green” open access publishing*: alternatively, beneficiaries may deposit the final peer reviewed article or manuscript in an online disciplinary, institutional or public repository of their choice, ensuring open access to the publication within a maximum of six months.

Moreover, the relevant beneficiary will deposit at the same time the research data presented in the deposited scientific publication into a data repository. The Consortium will evaluate which of these data will be part of the data to be published on the REFRESH Open Research Data Platform mainly according to ethics and confidentiality reasons.

3.1 Selection of Suitable Publishers

Each publisher has its own policy on self-archiving (i.e, the act of the author's depositing a free copy of an electronic document online in order to provide open access to it). Since publishing conditions of some publishers might not fix to open access requirements applying to REFRESH on the basis of the Grant Agreement, each partner in charge of dissemination activities will identify the most suitable repository.

Particularly, beneficiaries will not choose a repository which claims rights over deposited publications and precludes access.

At this stage any specific journal has been identified each beneficiary, in collaboration with the project coordinator, will evaluate if the identified journal and its article sharing policy can respect the Consortium Agreement in terms of Open Access. According to consortium partners' previous Open Access experience, ELSEVIER journals could be considered a good option.

3.2 Bibliographic Metadata

As mentioned in the Grant Agreement, metadata for scientific peer reviewed publications must be provided. The purpose is to maximize the discoverability of publications and to ensure EU funding acknowledgment.

The inclusion of information relating to EU funding as part of the bibliographic metadata is necessary also for adequate monitoring, production of statistics and assessment of the impact of Horizon Europe.

All the following information must be included in the metadata associated to each REFRESH publication.

Information about the grant number, name and acronym of the action:

- European Union (UE);
- Horizon Europe (HEU);

- Innovation Action (IA);
- REFRESH [Acronym];
- Grant Agreement: GA N° 101096858.

Information about the publication date and embargo period if applicable:

- Publication date;
- (eventual) length of embargo period.

Information about the persistent identifier:

- Persistent identifier, if any, provided by the publisher (for example an ISSN number).

4 Research Data

Research data refers to data that is collected, observed, or created within a project for purposes of analysis and to produce original research results. Data are plain facts. When they are processed, organized, structured and interpreted to determine their true meaning, they become useful and they are called information.

In a research context, research data can be divided into different categories, depending on their purpose and on the process through which they are generated. It is possible to have:

- **Observational** data, which are captured in real-time, for example, sensor data, survey data, sample data.
- **Experimental** data, which derive from lab equipment, for example resulting from fieldwork;
- **Simulation** data, generated from test or numerical models

Research data may include all of the following formats:

- Text or word documents, spreadsheets;
- Laboratory notebooks, field notebooks, diaries;
- Questionnaire, transcripts, codebooks;
- Audiotapes, videotapes;
- Photographs, films;
- Test responses;
- Slides, artifacts, specimen, samples;
- Collection of digital objects acquired and generated during the research process;
- Data files;
- Database contents;
- Models, algorithms, scripts;
- Contents of software application such as input, output, log files, simulations;
- Methodologies and workflows;
- Text of normative and standards;
- Outcomes of stakeholders events and questionnaire/surveys;
- Standard operating procedures and protocols;

4.1 Key principles for open access to research data

The research data and other research outputs will be directly connected in REFRESH project. REFRESH Research Data Management (RDM) process for collecting, generating and re-using data will be in line with the FAIR principles. Thus, measures will be taken to ensure FAIR standards meeting (e.g. standardized formats for variables, code lists, code and metadata). FAIR principles, which will provide the foundation for handling data within the project, have been well described in the Horizon 2020 “Guidelines on FAIR Data Management”. According to these guidelines, research data that will be released as Open Access must be findable, accessible, interoperable, re-usable. The H2020 FAIR guiding principles are summarized in the following table. Although this table refers to the previous Horizon research and innovation programme and no updated information are available, these principles well

apply also to HORIZON Europe Projects. If further information will be release by EC in the upcoming months, these will be integrated in the future updates of the current document.

Table 1 - FAIR guiding principles

FINDABLE	F1 (meta)data are assigned a globally unique and eternally persistent identifier F2 data are described with rich metadata F3 (meta)data are registered or indexed in a searchable resource F4 metadata specify the data identifier
ACCESSIBLE	A1 (meta)data are retrievable by their identifier using a standardized communications protocol A1.1 the protocol is open, free, and universally implementable A1.2 the protocol allows for an authentication and authorization procedure, where necessary. A2 metadata are accessible, even when the data are no longer available
INTEROPERABLE	I1 (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation I2 (meta)data use vocabularies that follow FAIR principles I3 (meta)data include qualified references to other (meta)data.
RE-USABLE	R1 meta(data) have a plurality of accurate and relevant attributes. R1.1 (meta)data are released with a clear and accessible data usage license R1.2 (meta)data are associated with their provenance R1.3 (meta)data meet domain-relevant community standards.

To allow data sharing in compliance with General Data Protection Regulation (GDPR) principles, several options will be made available, including a federated information sharing approach. For what concerns data management, a portion of the relevant data for the project comes from:

- existing datasets;
- previous R&D Project (particularly for modelling/technology catalogue development);
- data collected from stakeholders involvement.

In addition to existing ones, new data sets will be produced during the project, and whenever possible, they will also be made available as open data or through open services. However, it must be noted that several data sets, in particular those concerning personal information, cannot be made available outside the project Consortium. Open research data will be encouraged among the consortium through a targeted communication and dissemination strategy, which will be aligned with DMP, and will ensure rapid identification of mechanisms and pipelines for sharing knowledge. REFRESH will deposit the datasets on trusted repositories, as soon as they will be ready according to the DMP, in order to ensure the deposition and access to publications and research data.

4.2 Research Data Repositories

All data collected during the project will be in the first instance stored and preserved in an online data repository/cloud platform linked to the project website with access limited to the REFRESH Consortium, managed by RINA-C and intended for internal uses. Particular attention will be paid to the confidential and/or sensitive data and the consortium will not disclose or share this information to third parties.

In the internal REFRESH Consortium Repository a specific folder will be dedicated for the collection of data to be included in the future REFRESH Open Research Data Platform.

Furthermore, it is important to remark that this Data Management Plan will be updated in the different periodic reports at the end of each reporting period.

Concerning the open access of discoverable data, different online public repository possibilities will be investigated in subsequent stages of the project. Some examples of suitable repositories under evaluation are shown below:

- ORE is a publishing platform for streaming research funding program (e.g. Horizon 2020, Horizon Europe and Euratom), which ensures fast publication and open peer review;

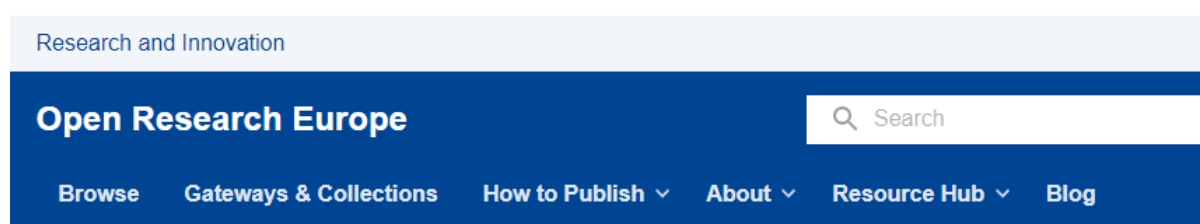


Figure 1 - ORE homepage

- ZENODO is the open access repository of Open Access Infrastructure for Research in Europe (OpenAIRE). The goal of OpenAIRE portal is to make as much European funded research output as possible available to all. Institutional repositories are typically linked to it. Moreover, dedicated pages per project are visible on the OpenAIRE portal, making research output (whether it is publications, datasets or project information) accessible through the portal. This is possible due to the bibliographic metadata that must accompany each publication;

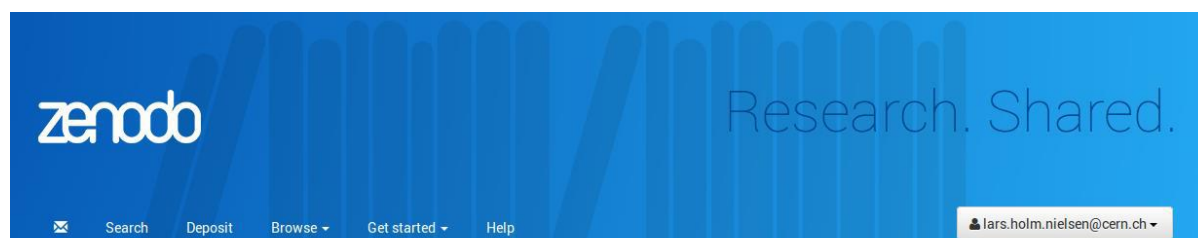


Figure 2 - Zenodo homepage

- LIBER supports libraries in the development of institutional research data management policies and services. It also enables the exchange of experiences and good practices across Europe. Institutional infrastructures and support services are an emerging area and will be linked to national and international infrastructure and funder policies. Building capacities and skills, as well as creating a culture of incentives for collaboration on research data, management are the core targets of LIBER.



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Association of European Research Libraries

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Open Access

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Figure 3 - Liber homepage

In case of availability of institutional/industrial repositories and depending on the particular institutional policies for their use (e.g. it might be the practice of the company that all open access publications must be deposited in there), the research data and scientific publications by REFRESH might be deposited and made openly accessible even on institutional/industrial repositories.

4.3 Roadmap and procedures for Data Sharing

REFRESH will generate a relevant amount of data: as already introduced a part of these data could be made available not only for the purposes of the project but also for other tools and studies and presented in a specific section of the project website.

To facilitate the project data publication and in parallel guarantee confidentiality of the data and the linking with the open research data, a repository will be developed in order to share the selected project data towards external communities.

The access to this repository will be given after end-user registration and approval from the Project coordinator. The website provides a source catalogue, metadata and description of all the resourced to be shared.

According to the aforementioned principles (Section 4.1), information on data management is disclosed by detailing the next elements:

- **Data set reference and name:** Identifier for the data set to be produced.
- **Data set description:** its origin (in case it is collected), nature and scale and to whom it could be useful, whether it underpins a scientific publication. Information on the existence (or not) of similar data and the possibilities for integration and reuse will be also included.
- **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), outlines of technical mechanisms for dissemination and necessary software and other tools for enabling re-use, and definition of whether access will be widely open or restricted to specific groups. The repository where data will be stored will be identified, if already existing, indicating in particular the type of repository (institutional, standard repository for the discipline, etc.). In case the dataset cannot be shared, the reasons for this should be mentioned (e.g. ethical, IP, privacy related, security-related etc.).
- **Archiving and preservation** (including storage and backup): Procedures that will be put in place for long-term preservation of the data. Indication of how long the data should be preserved, what is its approximated end volume, what the associated costs are and how these are planned to be covered.

Since at M6, data set has not been generated yet, the previous list has to be intended as a guideline for data generated in the future. Obviously, the sharing of data will be strictly linked to the level of confidentiality of the data itself. In particular, the level of confidentiality of gathered data will be checked by the partner responsible for the activity (task leader) in which data has been collected, with the data owners (such as public event organizer, energy/gas utility/authority, technical committees for current or future normative, equipment manufacturers, energy provider, industry, associations, etc...) in order to verify if data can be disclosed or not. For the purpose, a written confirmation to publish data in the REFRESH Open Access Repository will be asked via e-mail by the task leader to the data owner. It will be possible to make such data available only following the received confirmation provided by the data owner.

No confidential data generated within the project will be made available in digital form.

5 Expected Datasets

During the project several types of data will be collected in order to assess the new strategies as well as practices in comparison with current ones, with the objective of evaluating their efficacy.

This type of research data will primarily consist in information such as facts and numbers (especially statistics as well as factual data, such as those related to market conditions/prices/tariffs etc.), which will be collected to be examined and considered as basis for reasoning, discussion, and calculation, as well as results of interviews and surveys (especially those aimed at the prototyping and on-board integration activities and the business modelling formulation).

Accordingly, the beneficiaries will:

- Verify with the data owners the level of confidentiality of the gathered data;
- Deposit the agreed and approved by DSC publicly disclosable data produced within or collected for the purposes of the project (including associated metadata) in an open research data repository;
- Check if the shared data could be stored and how long they could be stored;
- Take measures to allow any user to access, mine, exploit, reproduce and disseminate free of charge the data;
- Provide information about tools and instruments necessary to validate the results (providing the tools and instruments themselves whenever possible, or alternatively providing at least information, via the chosen repository, about the tools and instruments necessary to validate the results, such as specialized software or software code, algorithms, analysis protocols, etc.).

Beyond input data listed above, the following outputs will be made publicly available during the project lifetime, mainly distributing public deliverables on the website and other data/information such as:

- Results from stakeholders' surveys properly anonymized and after informed consent signature;
- Training and dissemination event materials;
- KPIs calculation models;
- Reference of submitted patents;
- Techno-economic framework initial assessment for replication and business model promotion.

It is also important to consider that the REFRESH demo sites will be open for dissemination visits and specific training (webinars) and different workshops will be organized.

At this early stage of the project, few datasets from the technical work packages have been already identified, specifying in the following tables some relevant aspects such as the origin of the data, their utility and format. The datasets will be updated during the project to create a complete dataset of REFRESH outcomes.

Dataset 2.3A	
Related task	T2.3 – MW assisted Thermal Cracking System design
Description	Methodology and experimental results from the microwave-assisted pyrolysis of pre-cut and shredded wind blade parts: yields of oil and recovered fibers, characterization of fibers (SEM, TGA, tensile tests, etc) and oils (GC-MS, TGA, etc).
Confidentiality	Confidential
Type and format	.docx, .xlsx, .pdf
Responsible	CIRCE

Dataset 2.3B	
Related task	T2.3 – MW assisted Thermal Cracking System design
Description	Methodology and experimental results from the microwave-assisted solvolysis of pre-cut and shredded wind blade parts: yields of oil and recovered fibers, characterization of fibers (SEM, TGA, tensile tests, etc) and oils (GC-MS, TGA, etc).
Confidentiality	Confidential
Type and format	.docx, .xlsx, .pdf
Responsible	CIRCE

Dataset 2.234	
Related task	T2.2, T2.3 and T2.4
Description	Characterization and laboratory analysis of the secondary raw materials and/or semi-finished products derived from REFRESH recycling processes
Confidentiality	Confidential
Type and format	Mainly spreadsheet (.xlsx)
Responsible	CETMA

Dataset 5.1	
Related task	T5.1 – Development of a smart tool for traceability systems
Description	Mass, environmental and economic parameters from the end-of-life blades, resulting waste streams, conditioning and recycling processes and final secondary materials, including location, transportation means and distances and involved stakeholders (with no personnel data).
Confidentiality	Public
Type and format	.docx, .xlsx
Responsible	TECNALIA

Dataset 5.5	
Related task	T5.5 – Development of a cement based material for 3D printing
Description	Cement based materials formulations, including materials quantities, printing process parameters and testing results (printability, strength, etc...) in their respective international system units.
Confidentiality	Confidential
Type and format	.docx, .xlsx
Responsible	TECNALIA

Dataset 6.1	
Related task	T6.1
Description	Eco-design guidelines for the development of new products from recycling or repurposing of EoL wind blades
Confidentiality	Public
Type and format	• Text (.docx) and/or slide (.pptx) summary report • New products requirements from benchmark/standards in .xlsx format • Technical datasheet of commercial materials in .pdf format
Responsible	CETMA

Dataset 6.3A	
Related task	T6.3
Description	Development at prototype level of new recycled/repurposed end products
Confidentiality	Confidential
Type and format	▪ Text (.docx) and/or slide (.pptx) summary report ▪ Design/numerical modelling in CAD or multimedia format ▪ Set of experimental parameters (composition, processing) in .xlsx format ▪ Characterization at component level (.xlsx)
Responsible	CETMA

Dataset 6.3B	
Related task	T6.3 – Manufacturing end products using high amount of secondary raw materials
Description	3D concrete printed dowels selected formulations, including materials quantities, printing process parameters and paths and testing results (printability, strength, performance, etc...) in their respective international system units.
Confidentiality	Confidential
Type and format	.docx, .xlsx
Responsible	TECNALIA

6 Potential Exceptions to Open Access

As already reported in Chapter 4, the level of confidentiality of data will be verified with the data owners in order to disclose only the information for which the consortium has received a written permission to publish from the data owners themselves.

It is foreseen that some data may be kept confidential and/or subject to restriction in the diffusion.

One potential exception to open access could be represented by the knowledge related to the LCA/LCC analysis that have already been described as Background and Foreground of project partners in the consortium agreement. Some of the partners have already asked to keep these data as confidential. Therefore, data could be only partially available.

Data subject to confidentiality restrictions would be provided by the participants themselves, industries etc., and they will be stored and protected with state-of-the-art security measures on the private project cloud platform managed by RINA-C as project coordinator, accessed only by selected and restricted personnel of partners, and will be used to validate the performances of the REFRESH innovations.

This list of potential exceptions to open access must be considered provisional. As reported above the data management plan will be updated at M30 in order to update it based on the project's evolution.

Regarding the handling of the data, a number of European directives will be taken into account in order to guarantee the correct processing of personal data. These directives include European Parliament's Directive 95/46/EC, Directive 2002/58/EC and Directive 2009/136/EC. The General Data Protection Regulation (GDPR) will also be considered when considering the subject of data protection.

7 Conclusion and next steps

The present document has intended to outline a preliminary strategy for the management of data generated throughout REFRESH project. Few dataset has been generated yet, so it is possible that in the future some aspects outlined in the present document will need to be refined or adjusted.

This initial data management plan has however demonstrated that the consortium fully commits itself to comply with open access requirements, even referring to the main fact that the REFRESH consortium is an industry driven group that has to maintain confidentiality of some industrial data. Moreover, a preliminary list of dataset has been generated, showing the soundness of the concepts that the projects aims to develop and demonstrate.

A dedicated Excel tracking sheet will be set up for the evaluation of the disclosure of project data. The results of this monitoring process (RINA-C) will be progressively presented and discussed during the Consortium General Assembly meetings along project life also discussing with the DSC which kind of data (except for those ones present on OA publications and public deliverables) would be published on the REFRESH website repository.

The update of the data management plan will be reported in the different periodic reports at the end of each reporting period.

References

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