

Application of Solar Thermal Energy to Processes

D9.6.1 'Data Management Plan'

Document Summary Information

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Executive Summary

This report has been prepared in the framework of Work Package 9 'Communication, Dissemination and Exploitation' and specifically under Task 9.2 'Dissemination Strategy Activities'. It offers an analysis on the main elements of the data management policy that is used by the participants regarding all the datasets that will be generated by the ASTEP project.

This is the initial Report of ASTEP's Data Management Plan D9.6, documented at the early stages of the project, establishing the procedures that ensure all data within ASTEP is used in compliance with the applicable European Commission legal framework, and in particular, the General Data Protection Regulation. These procedures formalize a FAIR (Findable, Accessible, Interoperable, Re-usable) data management framework, as per EC directions, with the ultimate goal of making data openly accessible and interoperable, and addressing data re-use considerations.

According to the EU guidelines for a Data Management Plan, it governs all data generated and collected during the project, the standards that will be used, how the research data will be preserved and what parts of the datasets will be shared for verification or re-use. The ASTEP Data Management Plan is setting the grounds for the identification, curation, publication and sharing of re-usable data assets for research.

This document will form the basis of a constant review and update of Data Management Procedures throughout the project's lifetime and will further be reviewed as per the project's Grant Agreement (GA), in M24 and M48.

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*According to ASTEP Quality Assurance Process:

- 3 months before Deliverable's Due Date: 50% version should be submitted for QA review.
- 1 month before Deliverable's Due Date: 100% version should be submitted for QA and peer review.
- Submission month: All required changes have been applied, (including the QA and peer reviews) and it is ready for submission.

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Glossary of terms and abbreviations

Acronyms

ASTEP	Application of Solar Thermal Energy to Processes
EC	European Commission
EU	European Union
DMP	Data Management Plan
DOI	Digital Object Identifier
FAIR	Findable, Accessible, Interoperable, Re-usable
GA	Grant Agreement
GDPR	General Data Protection Regulation
H2020	Horizon 2020
IPR	Intellectual Property Rights
ORDP	Open Research Data Pilot
SME	Small and Medium Enterprises
WP	Work Package

1. Introduction

The deliverable “D9.6.1 Data Management Plan” of ASTEP project is part of the Work Package (WP) 9 ‘Communication, Dissemination and Exploitation’. Even if according to the Grant Agreement (GA) [1] this deliverable is linked to Task 9.2 ‘Dissemination Strategy Activities’, it is suitable to address Task 1.5 ‘Data and Ethical Management, Planning and Assessment’. An analysis of the main elements of the data management policy that is used by the participants regarding all the datasets that will be generated by the project is indicated.

This document is the first version of the periodical report D9.6 ‘Data Management Plan’ and, as it is foreseen in the GA, there will be two updated versions of this document by M24 (April 2022) and M48 (April 2024), respectively. It has been prepared taking into account the Guidelines on Data Management in Horizon 2020 [2], the H2020 Programme Guidelines on FAIR Data Management [2] and other documents such as the Guidelines on Implementation of Open Access to Scientific Publications and Research Data provided by European Research Council (ERC) [3].

The elaboration of the Data Management Plan (DMP) provides ASTEP partners a guide to properly address all issues related also with data protection, including ethical issues and the security protection strategy when relevant. ASTEP also takes part in the Open Research Data Pilot (ORDP) aimed to improve and maximize access to and re-use or research data generated through H2020 projects. Also, under H2020 each beneficiary must ensure open access to all peer-review scientific publications relating to its results. Within ASTEP, these publications will also be available on the dedicated section of ASTEP web-page <https://www.astepproject.eu/>.

This document also gathers some FAIR (Findable, Accessible, Interoperable, Re-usable) principles in order to provide a DMP which is an enabler of maximizing the access to and re-use of research data, also ensuring open access to scientific publications and agreed datasets during and after the project.

Furthermore, a detailed description of the datasets to be handled in each WP of the project is presented, according to the requirements of the DMP template provided within H2020 program covering: the handling of research data during and after the project, what data will be generated, collected and processed, what methodology and standards will be applied, whether data will be shared/made open access and how, how data will be curated and preserved.

Regarding ethical concerns that could affect the project and their link with the new General Data Protection Regulation (GDPR), which offers some guidelines regarding data protection and security, ASTEP does not involve important personal data protection aspects, as it does not include the collection of sensitive and personal data.

1.1. Mapping ASTEP Outputs

The purpose of this section is to map ASTEP’s Grant Agreement commitments, both within the formal Deliverable and Task description, against the project’s respective outputs and work performed.

Table 1. Adherence to ASTEP’s GA Deliverable & Tasks Descriptions.	
TASKS	
Task 1.5 ‘Data and Ethical Management, Planning and Assessment’	Section 3, Annex 2
Through this task, data materializing during the project will be analysed, and a Data and Ethical Management document will be delivered, identifying best practices and specific standards. It will take into account ethical and Intellectual	<i>Sections 3 to 7 provide the guidelines to accomplish with the data management requirements in H2020 projects. The different datasets are identified and the measures to</i>

<p>Property (IPR) related constraints, for access, storage and curation of data collected during project's activities (WP2-WP8). For this reason, guiding principles and procedures regarding privacy, data protection, legal issues and ethical challenges will be considered.</p> <p>All data used in the project will be publicly available and will be freely used for the purposes of the project. Detailed information on the informed consent procedures in regard to data processing will be kept on file.</p> <p>Data suitability for sharing and reuse, in accordance with existing legislation framework and ethical requirements is guaranteed while satisfying the need of open access and open data guidelines of the EC will be assured. This document will be maintained and updated during the project, fully addressing the lifecycle of data generated at various phases of ASTEP. The Consortium Agreement will establish detailed processes for IPR management ASTEP Project Legal and Ethics Committee will incorporate European and national ethical and legal requirements.</p> <p>Regarding Personal data and Profiling, security measures to be implemented to prevent unauthorized access to personal data or the equipment used for processing, are the measures defined in the operations and processes manual and privacy policy of the company for protection of Personal data and relates to technical and organization measures designed to ensure data privacy. These processes are in line with the local and EU GDPR legislation. Furthermore, data that could be collected will treated with a FAIR (Findable, Accessible, Interoperable, and Reusable) approach as defined by the related H2020 policy.</p> <p>No processing of sensitive or generic data (as per article 9 of the regulation) will be involved. Research does not involve profiling.</p>	<p><i>make the data FAIR are given, also taking into account the IPR management.</i></p>
<p>Task 9.2: Dissemination Strategy Activities</p>	<p>Section 5 and Section 6</p>
<p>Target audiences will be identified ranging from researchers and industry/SMEs in solar energy and industrial processing especially in energy intensive sectors.</p> <p>An important part of the Dissemination Strategy will be a timetable of the dissemination activities, to ensure the protection of certain project results before being made public. Moreover, once the protection activities are concluded, UPCT will ensure that all internal dissemination has taken place before release of information to the public.</p>	<p><i>Section 5 is aimed to enumerate the generated research data and set out the FAIR approach.</i></p> <p><i>Section 6 deals with IPR aspects.</i></p>

DELIVERABLE	
D9.6.1 'Data Management Plan'	Section 2, Annex 1
Analysis of the main elements of the data management policy that will be used by the applicants regarding all the datasets that will be generated by the project. Reviewed at M24 and M48.	<i>Sections 3 and 7 show the analysis done in order to meet the H2020 program standards for the data management, regarding the data management and ethical aspects respectively.</i>

1.2. Relation to other Deliverables

The information provided in this deliverable is closely related to those provided in the deliverables D1.3 'Data & ethical management' [4], D10.1 'POPD – Requirement No. 1' [5] and D10.2 'POPD – Requirement No. 2' [6] and to Task 1.5 activities as described below. The first release of the D1.3 and the D10.1, D10.2 are simultaneously submitted in M6, October 2020 as this document.

- Task 1.5 'Data and Ethical Management, Planning and Assessment' requirements

Task 1.5 is committing in delivering a Data and ethical Management document as well as guiding principles and procedures regarding privacy, data protection, legal issues and ethical challenges, that are part of the obligations regarding to this document.

- D1.3 'The Data & Ethical management report', D1.3

The objective of this Deliverable is to provide the ASTEP consortium the guidelines to be followed in order to meet the established H2020 project standards for the data and ethical management.

- Deliverable D10.1 'POPD-Requirement_No.1'
- Deliverable D10.2 'POPD-Requirement_No.2'

Furthermore, WP10 is devoted to fulfil and deal with the 'ethics requirements' that ASTEP must comply with. D10.1 provides the security measures that will be implemented to prevent unauthorised access to personal data or the equipment used for processing. D10.2 refers to the detailed information on the informed consent procedures in regard to the data processing with an explicit confirmation that the data used in the project is publicly available and can be freely used for the purposes of the project.

In an attempt to avoid displaying repeated information on the deliverables, the above deliverables should be read in conjunction and not in isolation.

1.3. Deliverable Overview and Structure

The structure of the document and the relationship between the different sections is as follows:

- Section 1 introduces the document and explains its overall purpose and its relation to other WP's and deliverables.
- Section 2 focuses on a recap of the projects overview, aim and commitments in order to determine the data management plan.
- Section 3 describes the Data management plan for ASTEP project and the data overview per WP.
- Section 4 describes the roles and responsibilities of the ASTEP consortium, of the stakeholders and of the data providers.
- Section 5 is aimed to enumerate the generated research data and set out the FAIR approach.
- Section 6 deals with IPR aspects.
- Section 7 is linked to data ethics and security involved in ASTEP.
- Section 8 provides the conclusions and a summary on follow-up activities.

2. ASTEP project Overview

In order to determine the DMP of this project, we revisit the project's objective and scope outlining the key requirements and, therefore, how and where the data management elements need to concentrate and what the framework should be.

ASTEP project is a Research and Innovation Action that aims to cover the heating and cooling demands for industrial processes by successfully demonstrating the viability of applying solar thermal energy at temperatures and for latitudes where current designs are not able to supply it.

ASTEP will validate the integration of these concepts in two industrial case studies demonstrating the viability of the proposed solutions for different industries located at different latitudes, which will enable the use of the developed technology in EU countries where concentrating solar systems have very limited or no application. Validation will be carried out installing a single module of 17 kW_{th} (peak) in each industry, able to produce from 50 kWh per day in winter to 135 kWh per day in summer. This performance should lead to a solar contribution of 25 MWh yearly, avoiding 5.7 t of CO₂ to the atmosphere, saving 2 t of Natural Gas (KPI 7) and 5 kg of NO_x (compared to uncontrolled burners), in each industry. The module size (8 m diameter) is selected to use the most common standard components in the solar industry (evacuated and coated tubes) and thin mirrors with a width and length small enough to be manufactured in conventional furnaces in glass industry.

Since we are collecting, disseminating and/or protecting all these data and results of the project, all consortium should follow some guidelines in order to all be compliant with the H2020 requirements and the GDPR.

3. Data Management in ASTEP

ASTEP as a H2020 project is obliged to provide a continuously updated DMP that describes what data will be used and produce throughout the project. In addition, whether and how data produced will be exploited or made (openly) accessible and re-use and how this data will be curated and preserved after the end of the project.

3.1. Data Management Plan

The Data Management Plan describes the types of data that will be collected, generated and/or processed within the project and how these data will be handled during ASTEP project and after the project, standards to be used, the ways in which data will be exploited and shared and in which way data will be preserved and stored.

As a result of ASTEP joint Research & Development activities significant amount of data will be produced over the projects' lifetime. A DMP is developed to set standards for protecting and managing the generated data and to maintain its integrity, such is available during and after the project to its owners, stakeholders and/or the public, depending on the level of confidentiality.

A well-structured data plan minimizes the risk of loss of valuable data which would negatively impact future projects building on the results of ASTEP. The purpose of the DMP is to provide an analysis of the main elements of the data management policy that will be used by the applicants regarding all the datasets that will be generated by the project.

The DMP template will be developed using guidance provided by the EU and the Digital Curation Centre. The corresponding deliverable is being issued by M6 and will be updated as new data sets are produced. It should address the points below on a dataset by dataset basis and should show the current status of reflection within the consortium about the data that will be produced:

- Data set reference and name,
- Data set description,
- Data sharing,
- Archiving and preservation (including storage and backup),
- Personal data.

A table summarizing the generated data, how it will be accessible (if possible) and how it will be preserved will be released in the following updated within the DMP.

Prior to this, in this section ASTEP's GA commitments throughout the project's WPs along with their outputs and work plan to be performed are mapped graphically and presented below (Fig.1). In addition, the data generated by the WPs is defined.

A most detailed data flow on ASTEP project is depicted on Section 3 of D1.3 [4] Data and ethical management.

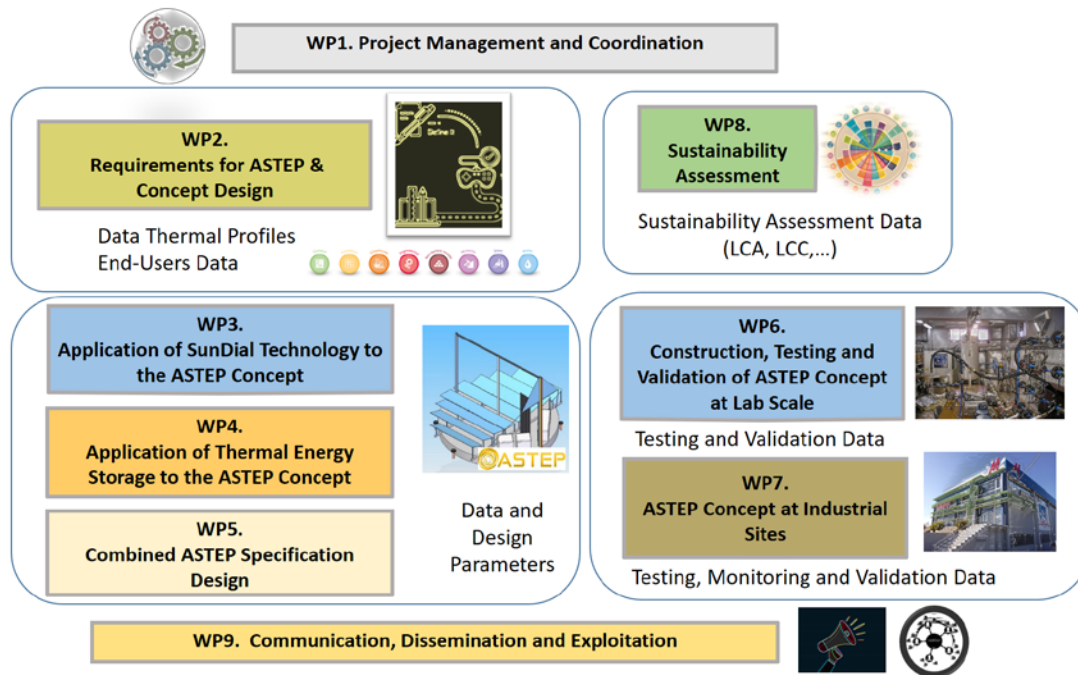


Fig. 1. Data generated within WPs

3.2. Data Overview per WP

Every WP Leader provides and will update all data that will be collected under each WP listed below, additionally supporting figure 1. On M24 this information will be also included. Due to the preliminary stages of the project the tentative information that is currently foreseen is provided on Annex I.

3.2.1. WP1 'Project Management and Coordination'

Datasets in WP1 can be divided into three groups: interaction with partners and external advisory board; interaction with the project officer and assessment and generation of documents in the form of deliverables.

Interaction with partners is required to implement the coordination of the project. Interaction with the project officer is required to allow the information exchange between the European Commission (EC) (through the Agency) and the consortium (through the coordinator). In addition to the deliverables of the own WP1 and in order to ensure the quality and right progress of the project, all the deliverables will be reviewed by the coordinator and the quality assurance managers at the different stages of their preparation.

3.2.2. Design Work Packages

Following the arrangement established in D1.2 'Project Management Plant' [7], design activities are included in WP2, WP3, WP4 and WP5.

WP2 'Requirements for ASTEP & Concept Design' collects data regarding the data thermal profiles of relevant industrial sectors and ASTEP's end-users data.

In WP3 'Application of the SunDial Technology to the ASTEP Concept', datasets are aimed to the design of the Sundial Technology for different industries and end users. Besides, it involves the data from the CFD simulations performed such as: geometry files, mesh files, and the numerical results obtained.

WP4 'Application of Thermal Energy Storage to the ASTEP Concept' involves the data and design parameters of the storage system. Like in WP3, it also involves the data from the CFD simulations performed and results.

Finally, the purpose of data collection in WP5 'Combined ASTEP Specification Design' is to include in the ASTEP system simulation and design the performance of individual components (WP3 and WP4) and the requirements of industrial sites. Regarding data generation, results of the simulations will be used to retrofit and WP3 and WP4 and include possible changes in their design. In addition, data generation will be used to select components of the ASTEP system.

3.2.3. Testing and results Work Packages

Testing & results Work Packages the ones focused on the implantation at laboratory environment, testing at the End-user case studies and result analyses, and is formed by WP6, WP7 and WP8 [7].

The purpose of data collection in WP6 'Construction, Testing and Validation of ASTEP Concept at Laboratory Environment' is to carry out the components procurement and construction as specified in WP3, WP4 and WP5. Therefore, the final designs and component selection will have to be collected. Regarding data generation, results of the simulations will be used to predict the performance of the system in WP7.

The purpose of WP7 'ASTEP Concept at Industrial Sites' is (i) to gather energy consumption data from the processes at the two host sites and (ii) to use these data to measure the efficiency and overall effectiveness of the solar thermal system installed there within the ASTEP project. The data collection will allow identification of any performance problems that can be subsequently addressed to optimise operation.

Finally, WP8 'Sustainability Assessment' involves the collection of all the data gathered on the sustainable assessment of the project. At the current project stage, it is not possible to establish all the data that will be finally processed as some relevant tasks in terms of data collection are not finally defined yet.

3.2.4. WP9 'Communication, Dissemination and Exploitation'

In order to deploy and to leverage the communication, dissemination and exploitation activities, some communication tools have been launched at the beginning of the project, namely the website, several social media (LinkedIn and Twitter) and the Solar Helix within the Crowdhelix platform [8, 9].

The corresponding Privacy Policies informs the visitor/reader as to how these tools collect and process information about him/her and in particular his/her personal data. We hereby assure that the Privacies and Personal Data Protection Policies fully respects and complies with EU Regulation 679/2016 and any other relevant legislation [10]. Deliverable D1.3 [4] provides more detailed information on them.

The processing of personal data, such as name, address or e-mail address of a data subject shall always be in line with the GDPR, and in accordance with the country-specific data protection regulations applicable to the ASTEP Consortium. Through this data protection declaration, we inform anyone concerned and the general public of the nature, scope, and purpose of the personal data we collect, use and process. Furthermore, data subjects are informed, by means of this data protection declaration, of the rights to which they are entitled.

4. Roles and Responsibilities

As the DMP is a living document, the fact that at the moment there are still uncertainties about all the data involved within all the stages of ASTEP project does not release the Consortium participants of the obligation to ethically and lawfully collect, process and store any data that could be subject to special protection.

Besides, if apply, the privacy and security measures taken will be actively communicated through media channels with a privacy statement, adjusting the statement, whenever relevant, to fit the purpose, the target group and level of privacy.

As aforementioned, WP leaders will provide the information gathered regarding the data involved on the WPs they lead. Table 2 shows the responsible for these WP.

Table 2. Leaders of Work-Packages [11]

Title	Leader	Responsible	email
WP1 - Project Management and Coordination	UNED	A Rovira	rovira@ind.uned.es
WP2 - Requirements for ASTEP & Concept Design	BUL	S Tassou	Savvas.Tassou@brunel.ac.uk
WP3 - Application of the SunDial Technology to the ASTEP Concept	UNED	A Rovira	rovira@ind.uned.es
WP4 - Application of Thermal Energy Storage to the ASTEP Concept	UPCT	JP Solano	JuanP.Solano@upct.es
WP5 - Combined ASTEP Specification Design	UPM	R Abbas	ruben.abbas@upm.es
WP6 - Construction, Testing and Validation of ASTEP Concept at Laboratory Environment	UPM	R Abbas	ruben.abbas@upm.es
WP7 - ASTEP Concept at Industrial Sites	DRA	D Reay	dareay@aol.com
WP8 - Sustainability Assessment	VERT	L Petruccelli	luca.petruccelli@verttech-group.com
WP9 - Communication, Dissemination and Exploitation	CHX	A Rahim	abdul@crowdhelix.com
WP10 - Ethics requirements	UNED	A Rovira	rovira@ind.uned.es

5. Generated Research Data

Research data, according to the H2020 open access dissemination report, is information (particularly facts or numbers) collected to be examined and considered, and to serve as a basis for reasoning, discussion or calculation. ASTEP project endorses the EU's motto regarding Open Data and FAIR principles that involve: "to make the data as open as possible, but as closed as necessary" [3]. In a research context, examples of data include statistics, results of experiments, measurements, observations resulting from fieldwork, survey results, interview recordings and images. The focus is on research data that is available in digital form. Users can normally access, mine, exploit, reproduce and disseminate openly accessible research data free of charge. ASTEP project will try to make the non-subject to protection data as broadly available as possible.

According to the guidelines to the rules on Open Access to Scientific Publications and Open Access to Research Data in H2020, Open Access refers to the practice of providing online access to scientific information that is free of charge to the end-user and reusable. In the context of research and innovation, the two practises on open access data, are described below. In addition, a set of preliminary guidelines concerning FAIR principles are established.

The Europe 2020 strategy for a smart, sustainable and inclusive economy underlines the central role of knowledge and innovation in generating growth. Broader access to scientific publications and data therefore helps to:

- build on previous research results (improved quality of results),
- encourage collaboration and avoid duplication of effort (greater efficiency),
- speed up innovation (faster progress to market means faster growth), and
- involve citizens and society (improved transparency of the scientific process).

5.1. Open Access for Scientific Publishing

The H2020 main guidelines are directed to have research based on sustainability and inclusive economy with the important role of promoting knowledge and innovation in generating growth. Since the Project follows the H2020 open access strategy for scientific publications, all the results that are publishable will follow an open-access model in order to optimize the impact of publicly funded scientific research, both at European level (FP7, H2020) and at Member State level. This way, Europe's ability to enhance the economic performance of its companies and improve the capacity to compete through knowledge is improved. Furthermore, they will include explicit reference to EU funding.

According to the EC "under Horizon 2020, each beneficiary must ensure open access to all peer-reviewed scientific publications relating to its results" [3]. The Consortium as mentioned adheres to the EU open access to publications policy, choosing as most appropriate route towards open access self-archiving (Green Open Access), namely a "published article or the final peer-reviewed manuscript is archived (deposited) in an online repository before, alongside or after its publication. Repository software usually authors to delay access to the article (embargo period)" [3]. The Consortium will ensure open access to the publication with a maximum of six months.

In compliance with the GA, free-online access will be privileged for scientific publications, following the above-mentioned rules of "green" open access. All relevant information and the platform textual material (newsletters, leaflets, public deliverables, etc.) will be also freely available on the project's website (<https://www.asteproject.eu/>). In order to guarantee security, confidential material will be available in ASTEP Teams platform. In specific cases and according to the rules of open access, the dissemination of research results will be managed by adopting precautionary Intellectual Property Rights (IPR) protection protocols, not to block the possibility of protecting the achieved foreground with preventive disclosures.

Also, according to the EC "research data is information (particularly facts of numbers) collected to be examined and considered, in order to serve as basis for reasoning, discussion, calculation" [3].

5.2. Open access to research data

Open access to research data is the right to access and reuse digital research data under the terms and conditions set out in the GA. Regarding the open research data generated in the action, ASTEP Consortium intends to deposit them in a research data repository, Zenodo, and will take measures to allow third parties to access, reproduce and disseminate, free of charge for any users.

5.3. FAIR principles

A FAIR approach -a set of guiding principles [12]- is described, to make data Findable, Accessible, Interoperable, and Reusable.

Regarding open access for the peer reviewed publications, as stated within the GA, the bibliographic metadata must be in a standard format and must include the terms "EU", "Horizon 2020", the name of the action, acronym and grant number; the publication date, length of embargo period (if applicable), and a persistent identifier (such as DOI). The DOI (Digital Object Identifier) is a unique alphanumeric string assigned by a registration agency to identify content and provide a persistent link to its location on the Internet [13]. The publisher assigns a DOI when an article is published and made available electronically.

5.3.1. Findable

When data sets are stored in a trusted repository, the name will be adapted in order to make it more findable. Besides, keywords will be added aligned with the content of the publication / datasets and with relevant terminology used in the field, to make these easily findable.

5.3.2. Accessible

The intention of ASTEP project is to open as many data as possible that are not subject to IPR protection. These late data might be opened through a very restricted license or will remain completely closed. The data that will be accessible and those which will not be updated along project development, as well as the reasons observed.

ASTEP adhered to the ORD pilot (open access to research data) adopting an open access policy of all project results, guidelines and reports, providing and on-line access to scientific information that is free of charge to the reader. Open access will be provided in two categories: scientific publications (e.g. peer-reviewed scientific research articles, primarily published in academic journals) and research data.

ASTEP Consortium will make a great effort, whenever possible, to make the research data available as open data through open services. It is important to note that because of the low maturity of this document and existing uncertainties about the data collected in the project, additional details are going to be inserted in here as the project progresses.

5.3.3. Interoperable

Whenever possible suitable metadata standards will be considered. Based on the scientific field where the data set will originate from, additional meta-data standards might be used.

5.3.4. Reusable

When possible, the data set will be licensed under an Open Access license. However, this will depend on the level of privacy, and the IPR involved in the data set. A period of embargo will only be necessary if a data set contains specific IPR or other exploitable results that will justify it. The length of embargo will be negotiated on an individual basis. Restrictions will only be applied when privacy, IPR or other exploitation issues are in play.

Appropriate meta-data conventions will be applied where required.

5.4. FAIR Approach [12]

In order to guide the Consortium members, the following FAIR approach will be applied within the project. Per WP the tentative information to gather is:

- Data Summary:

Please address the following issues:

- Purpose of the data collection/ generation
- Relation to the project objectives
- Specify the types and formats of data collected/generated
- Specify if existing data is being re-used (if applicable)
- Specify the origin of the data
- Establish the expected size of the data (if known/ possible)
- Outline the data utility: to whom will it be useful

- FAIR (Findable): Making data findable

Please address the following issues:

- Outline the discoverability of data (metadata provision)
- Outline the identifiability of data and refer to standard identification mechanism. Use of persistent and unique identifiers such as DOI
- Outline naming conventions used
- Outline the approach toward search keyword
- Outline the approach for clear versioning
- Specify standards for metadata creation (if any). If there are no standards in your discipline describe what type of metadata will be created and how

- FAIR (Accessible): Making data openly accessible

Please address the following issues:

- Specify which data will be made openly available. If some data is closed please provide rationale
- Specify how the data will be made available
- Specify what methods or software tools are needed to access the data. Is documentation about the software needed to access the data included? Is it possible to include the relevant software (e.g. in open source code)?
- Specify where the data and associated metadata, documentation and code are deposited
- Specify how access will be provided in case there are any restrictions

- FAIR (Interoperable): Making data interoperable

Please address the following issues:

- Assess the interoperability of your data. Specify what data and metadata vocabularies, standards or methodologies you will follow to facilitate interoperability
- Specify whether you will be using standard vocabulary for all data types present in your data set, to allow interoperability? If not, will you provide mapping to more commonly used ontologies?

- FAIR (Reusable): Increase data re-use

Please address the following issues:

- Specify how the data will be licenced to permit the widest reuse possible
- Specify when the data will be made available for re-use. If applicable, specify why and for what period a data embargo is needed
- Specify whether the data produced and/or used in the project is useable by third parties. In particular after the end of the project. If the re-use of some data is restricted explain why
- Describe data quality assurance process
- Specify the length of time for which the data will remain re-usable

- Allocation of resources:

Please address the following issues:

- Estimate the costs for making your data FAIR. Describe how you intend to cover these costs
- Identify responsibilities for data management
- Describe costs and potential value for long time preservation

- Data security:

Please address the following issues:

- Address data recovery as well as secure storage and transfer of sensitive data

- Ethical Aspects:

Please address the following issues:

- To be covered in the context of the ethics review, ethics section of DoA and ethics deliverables. Please include references and related technical aspects if not covered by the former.

Within Annex I, the final Data Questionnaire that has been submitted to WP leaders is shown. This questionnaire was customized according to the envisaged needs of ASTEP project. The preliminary information collected was provided per WPs, within the next update of the deliverables (M24) this information will be updated and enriched.

6. Intellectual Property Rights

Intellectual property generated within the project will be protected by patents, if appropriate, and its management will be regulated in compliance with the final Consortium Agreement [14] and the intellectual property agreement among the partners. The consortium has identified three levels of Foreground (Results) intellectual property which will be created in the course of the project:

- Individual and joint intellectual property, which belongs to individual partners or is jointly owned by partners working in a particular task and is restricted to those partners.
- Generic intellectual property, which can be used by all partners of the consortium. Some of the generic IP will be made more widely available to European academics, SME's and other industrial organizations.
- Publicly available IP which will be published at conferences, on the public web site and made available with no restrictions.

The general principles for Intellectual Property Aspects set out by the EC for Horizon2020 projects will apply in ASTEP.

7. Data Ethics and Security

ASTEP consortium is committed to ensure that ethical principles and legislation are applied in the scope of the activities performed in the project from the beginning to the end, and the guidelines to participants and the policy is provided in D1.3 [4]. The consortium has not identified relevant ethical concerns already during the preparation of the project proposal and during the preparation of the GA (Self-assessment is presented in D1.3). Nevertheless, the GDPR, will be followed in ASTEP project and its principles will be used as guidelines.

It should be underlined that there still uncertainties about all the final data collected within ASTEP project, thus additional details will enrich the following deliverables along the project progresses. In the context of this deliverable, the ethical issue that could have more impact on data handling and sharing during and after the project are addressed below.

7.1. Ethics-Personal Data

Personal data collection is required for activities including, but not necessarily limited to, the consortium management (WP1), social acceptance tasks (Task 8.4), exploitation, dissemination and external communication activities (WP9). The procedures for data management [4], including personal data protection, have been prepared and shared with all partners as part of Task 1.5 'Data and Ethical Management'. By M6, the task has produced the initial version of the D1.3 'Data & Ethical management' report. The Plan details, among other procedures and measures, security measures to be implemented to prevent unauthorized access to personal data or the equipment used for processing. These measures will cover the measures defined in the operations and processes manuals and privacy policies of the organisations involved in such activities for protection of Personal data and relate to technical and organization measures designed to ensure data privacy. These processes are in line with the local and EU GDPR legislation [10].

More specifically, standard measures will include:

- Protection of electronic files with restricted access and password,
- Backup procedures and firewall set up,
- Security protocols on email communication,
- Internal audits and trainings,
- Personal data gathering by using a secure online platform (HTTPS),
- Encryption and anonymization of data if and where needed,
- Protection of hard copy files in locked cabinets with a need-only access policy.

Furthermore, data that could be collected will treated with a FAIR approach as defined by the related H2020 policy and as described in Section 5.3 and Section 5.4 of this document. No processing of sensitive or generic data (as per article 9 of the regulation) is involved.

7.2. Profiling

All Partners confirm that research does not involve profiling. Explicit confirmation by each partner is kept by the Coordinator. It is confirmed in Deliverable D10.1 [5].

7.3. Informed Consent Procedures

All partners confirm that the data used in the project is publicly available and can be freely used for the purposes of the project. An explicit confirmation of that will be reported in Deliverable D10.2 [6].

Detailed information on the informed consent procedures in regards to data processing will be kept on file. When collecting personal information, if applicable, researchers and staff require to get informed consent from the participants. Deliverable D1.3 [4] includes information regarding informed consent.

7.4. Security

All Partners confirm that clause 37 of the GA [1] 'activities including dual use' should not be selected in Grant Management Data. All Partners confirm that none of the Partners intend to use in the project substances listed in annex I of council regulation No 428/2009 [15]. Explicit confirmation by each partner is kept by the Coordinator.

8. Conclusions

This deliverable provides a description of the Data Management Plan (DMP) for ASTEP project intending to define how data will be collected, stored, shared and protected. This is a preliminary and living document that will be updated on M24 and M48.

The DMP is a powerful tool to capture the nature, source, format and purpose of data processed in the project. Its formulation and maintenance are key factors in providing a clear picture of the data inventory of the project. At the early stages the DMP remains a generic exercise with unknown factors prevailing as to the exact detail of the data to be processed. However, early engagement of the partners with the DMP will ensure its aim.

This document is the first version of the periodical report D9.6 'Data Management Plan' and as it is foreseen in the Grant Agreement, there will be two updated versions of this document by M24 (April 2022) and M48 (April 2024), respectively.

This deliverable is a living document. At this stage in the project, many questions concerning the data are still open for discussion. Questions concerning opening up the data or answers to questions related to the FAIR principles (Findable, Accessible, Interoperable and Re-use) will only have a provisional answer in this DMP. These questions will be properly addressed on the following updates of the DMP.

References

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- [11] A Rovira, G Avgousti, P Philippou, S Christofi, R Barbero. D1.1 – Project management and quality handbook, ASTEP project deliverable D1.1, 2020.
- [12] Guidelines on FAIR Data Management in Horizon 2020 Version 3.0 26 July 2016.
- [13] Digital Object Identifier (DOI) system. <http://www.doi.org>. Accessed on October 2020.
- [14] ASTEP Consortium Agreement, version1, May 2020.
- [15] Council Regulation (EC) No 428/2009 of 5 May 2009 setting up a Community regime for the control of exports, transfer, brokering and transit of dual-use items.

Annex I. Questions for the elaboration of the Data Management Plan

This annex provides preliminary information regarding the final data that will be compiled during the project duration. Thus, this section could be subject to modifications as the project progresses.

Data summary

1. What is the purpose of the data collection/generation and its relation to the objectives of the project?

WP1:

Datasets in WP can be divided into three groups: interaction with partners and external advisory board; interaction with the project officer and assessment and generation of documents in the form of deliverables.

Interaction with partners is required to implement the coordination of the project. Interaction with the project officer is required to allow the information exchange between the European Commission (through the Agency) and the consortium (through the coordinator). In addition to the deliverables of the own WP1 and in order to ensure the quality and right progress of the project, all the deliverables will be reviewed by the coordinator and the quality assurance managers at the different stages of their preparation.

WP2:

This WP will collect data regarding the data thermal profiles of relevant industrial sectors and ASTEP's end-users data.

WP3:

Datasets in WP are aimed to the design of the Sundial Technology for different industries and end users.

WP4:

This WP will involve the data and design parameters of the storage system. Besides, it will involve the data from the CFD simulations performed such as: geometry files, mesh files, and the numerical results obtained.

WP5:

The purpose of data collection in WP5 is to include in the ASTEP system simulation and design the performance of individual components (WP3 and WP4) and the requirements of industrial sites. Regarding data generation, results of the simulations will be used to retrofit and WP3 and WP4 and include possible changes in their design. In addition, data generation will be used to select components of the ASTEP system.

WP6:

The purpose of data collection in WP6 is to carry out the components procurement and construction as specified in WP3-5. Therefore, the final designs and component selection will have to be collected. Regarding data generation, results of the simulations will be used to predict the performance of the system in WP7.

WP7:

The purpose is (i) to gather energy consumption data from the processes at the two host sites and (ii) to use these data to measure the efficiency and overall effectiveness of the solar thermal system installed there within the ASTEP project.

The data collection will allow identification of any performance problems that can be subsequently addressed to optimise operation.

WP8:

This WP will involve the collection of all the data involved on the sustainable assessment of the project. At the current project stage, it is not possible to establish all the data that will be finally processed as some relevant tasks in terms of data collection are not finally defined yet. The template for the informed consent form can be found in D1.3 [4].

WP9:

The website has been launched and Website Privacy Policy is provided on D1.3 [4]. We have created a virtual community, the Solar Energy Helix, on the Crowdhelix platform that acts as the backbone of the dissemination and exploitation strategies developed in WP9 – for both during and after the project. Organisations will be notified by the platform about the advancements of ASTEP project, with the aim of maximizing the visibility of results to actors best placed to make use of them, and broaden their impact enabling the creation of a community. The Privacy Policy is also provided on D1.3 [4].

2. What types and formats of data will the project generate/collect?

(number, text, forms, drawings, audio-visual, mathematical models, simulation codes, etc.)

WP1:

- Electronic databases for the personal data and the collaborative platform.
- Files with the documentation managed during the coordination activities and the project progress.
- Files with general academic and technical publications or newsletters.

WP2:

- Databases with environmental data and design, operational and financial data.
- Files with the documentation managed: drawings, schemes.
- Databases with the system components (concept design).
- Files with academic and technical publications or newsletters.

WP3-WP5:

- Databases with environmental data and technical data (materials, costs, manuals, etc.).
- Files with the documentation managed: drawings, deliverables, manuals.
- Codes: mathematical procedures to simulate and characterise the systems.
- Databases with results of simulations.
- Databases with the system components selection and their integration.
- Files with academic and technical publications or newsletters.

WP6:

- Databases with environmental data and technical data (materials, costs, manuals, etc.).
- Files with the documentation managed: drawings, deliverables, manuals.
- Databases with the integrated results of tests (ORDP).
- Files with academic and technical publications or newsletters.

WP7:

All modes (number, text, forms, drawings, audio-visual, mathematical models, simulation codes) will be generated as appropriate.

Models and simulation codes will be incorporated in control and acquisition systems but will not be distributed outside those directly involved in hosting and assessing the case studies.

WP8:

- Databases with environmental data, financial and technical data.
- Notes and minutes of brainstorming, workshops.
- Reports after customized surveys (anonymisation is envisaged).
- Files with academic and technical publications or newsletters.

WP9:

- Illustrative data concerning organisations, both within the consortium and without, including (where applicable) their research groups and departments; User-supplied content data, in particular “collaboration opportunities” posted on the platform, and “comments” provided in response by other users.

3. Will you re-use any existing data and how?

WP1:

The coordination team re-use data available in the H2020 website and the corresponding legislation in order to meet the requirements in every aspect of the project management, as well as specialised literature regarding the project coordination tasks.

WP3-WP6:

Data will be re-used, which will be either collected form repositories or re-used from the partners' background or collected from WP2, WP3, WP4 and WP5. Data re-used will be accordingly acknowledged.

WP7:

Historical data on plant operation and performance, as well as energy bills, will be used as benchmarks for comparing performance after the new systems are installed.

Also employed will be outputs from models generated in previous packages, including those obtained in component tests in laboratories in the first two years of the project.

WP8:

Data will be re-used, which will be either collected form repositories/ databases/dataset or re-used from the partners' background or collected from previous WPs when relevant.

WP9:

We will be using CHX's existing database of users, opportunities, organisations and groups on the Crowdhelix platform, and our database of contacts on our Customer Relationship Management system, to disseminate the project and its outputs.

4. What is the origin of the data?

WP1:

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- European Commission. Regulation (EU) No 1291/2013 of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No 1982/2006/EC.
- European Commission. European Code of Conduct for Research Integrity. Revised Edition, ALLEA. All European Academies, 2017.
- European Commission. Horizon 2020 Programme Guidance How to complete your ethics self-assessment. Version 6.1, 4 February 2019.
- ISO 31000:2009 - Risk management – Guidelines.

WP3-WP6:

Academic and technical repositories, request to manufacturers, previous background. Specific dataset will be listed by M24.

WP7:

From plant energy consumption records – fossil fuels and electricity

Maintenance records – such as boiler records

Measurements taken during tests on site before and after the ASTEP installations

Results of tests in other work packages – in particular data generated in WP6

WP8:

Academic, industrial and technical repositories, request to manufacturers, previous background. Specific dataset will be listed by M24.

WP9:

- The data pertaining to users on the Crowdhelix platform originates from the users themselves, and is collected during the process of their signing up to the platform via <https://crowdhelix.com/signup> , and/or during the process of their posting; the data pertaining to our contacts on our Customer Relationship Management system originates from various sources, including:
 - Inbound contacts via the website “contact us” page
 - Participants in events managed by Crowdhelix
 - Correspondence with contacts’ organisations within the frame of discussing, or carrying out, contracts for our networking services
 - Social media interactions. (CHX)

5. What is the expected size of the data?

WP1:

All the data is in electronic data. It is expected a size about several hundreds of GigaBytes or a TeraByte.

WP3:

All the data is in electronic data. It is expected a size about several hundreds of GigaBytes.

WP5, WP6:

Several GigaBytes

WP7:

Unknown at present – will be known when the data collection systems and sensors are fully specified (before M24)

WP8:

Unknown at present.

WP9:

Unknown at present. Roughly 2,000 - 10,000 data of various types.

6. To whom might it be useful ('data utility')?

(the consortium, academic agents, industrial agents, other stakeholders)

WP1:

All the actions involving datasets are aimed either the Consortium or the Agency.

The deliverable D1.6 'Final Report' is a public deliverable that will be available for any stakeholder of any nature (industry, academic, future consortiums, interested citizens, etc.)

WP2:

The generated dataset will be firstly used in the following WPs for the implementation of the action. Publications of diverse nature are envisaged that will allow to be available and of utility for any stakeholder of any nature (industry, academic, future consortiums, interested citizens, etc.).

WP3:

Generated dataset will be used in WP4, WP5 and WP9 and subsequent WP6, WP7 and WP8.

Public deliverables D3.1 'Preliminary design of Sundial for AMTP', D3.2 'Preliminary design of Sundial for MAND' and D3.3 'Design of the daily and yearly operation for AMTP and MAND', as well as all derived publications (papers, conferences, newsletters) will be available for any stakeholder of any nature (industry, academic, future consortiums, interested citizens, etc.).

WP4:

The data required will be shared to other partners in the consortium for the successful completion of the project. Besides D4.1 and D4.2 will be made public and of interest for researchers, manufacturers and other relevant industrial stakeholders. Besides publications are also envisaged regarding this WP.

WP5:

Generated dataset will be used in WP3 and WP4 (retrofit), WP6 (for ASTEP system design) and subsequent WP6, WP7 and WP8. It will be also useful for dissemination purposes (WP9).

Deliverable D5.1 'Report on the integrated ASTEP model development and Conceptual Designs', will be public. In addition, all derived publications (papers, conferences, newsletters) will be available for any stakeholder of any nature (industry, academic, future consortiums, interested citizens, etc.).

WP6:

Generated dataset will be used in WP7 and subsequently WP8. It will be also useful for dissemination purposes (WP9).

Deliverables D6.2 'ASTEP Storage system Test Results', D6.2 'Integrated ASTEPs system Test results' and D6.4 'Integration of subsystems results' will be public. In addition, all derived publications (papers, conferences, newsletters) will be available for any stakeholder of any nature (industry, academic, future consortiums, interested citizens, etc.).

WP7:

After collection and analysis in WP7 some data will be used in WP8. Selected data (non-confidential) will also be useful for dissemination purposes. The output will be made public principally in deliverable D7.4, the public report on the outcome of the work in WP7.

WP8:

This WP involve all dimensions of sustainability assessment, thus the data generated will have a very wide target audience. Selected data (non-confidential) will be very useful for dissemination purposes and also open deliverables (D8.3, D8.5a) will be made public. As aforementioned, this information will be of interest for a wide variety of different stakeholders from general public to public authorities, researchers...

WP9:

- To Crowdhelix in carrying out its obligations in disseminating the project and its outputs, and in facilitating the impact of the project and the work of the consortium.

- (Where permissible in line with data protection legislation) to the consortium in understanding the success and reach of the above, and how to improve the impact and outreach of the project based upon data such as engagement trends with the Solar Energy Helix community. (CHX)

Making data findable

1. Are the data produced and/or used in the project discoverable with metadata, identifiable and locatable by means of a standard identification mechanism (e.g. persistent and unique identifiers such as Digital Object Identifiers)?

(all dataset in ASTEP will be stored in ASTEP teams and repositories like Zenodo, which provides DOIs)

WP1:

All deliverables are stored in the ASTEP Teams platform and, once approved, if they are public, in the website and in repository Zenodo, where a DOI is assigned.

WP2-WP6:

All deliverables are stored in the ASTEP Teams platform and, once approved, if they are public, in the website and in Zenodo repository, where a DOI is assigned.

All publications will be published in open access mode, with the corresponding keywords and DOI.

WP7:

The use of keywords will be used to search data, accessible by passwords.

All deliverables will be stored in in the ASTEP Teams platform, but only Deliverable D7.4 will be open access, in the public domain.

WP8:

All deliverables are stored in the ASTEP Teams platform and, once approved, if they are public, in the website and in Zenodo repository, where a DOI is assigned.

WP9:

- Datasets, such as those that can be anonymised, will be made available to the consortium in order to achieve the objectives set out in “data utility” above.

2. Will search keywords be provided that optimize possibilities for re-use?

(yes/no)

WP1-WP8: Yes

WP9:

- Keywords are only obtained as part of the data collection process, being utilised to power the platform’s “search” and “recommendation” functions.

3. What metadata will be created?

Regarding metadata provision, the tentative metadata associated with datasets could be: organization name, date, type of activity where the data was collected. It should be mentioned that further metadata might be added as the project develops.

Making data openly accessible

1. Which data produced and/or used in the project will be made openly available as the default?

(please revise the dissemination level of your deliverables)

WP1:

The only public deliverable in WP1 is D1.6 'Final Report'. All the previous information must be kept confidential as they basically deal with interaction among partners, information regarding the management of the project and interaction between the consortium and the Agency.

WP2:

As aforementioned, the generated dataset will be used in the following WPs for the implementation of the action. Thus, all the deliverables were made confidential.

WP3:

Deliverables D3.1, D3.2 and D3.3 are public. Deliverables D3.4, D3.5 and D3.6 are confidential since they will contain information regarding industrial processes of the end-users.

All the papers in journals, conferences, newsletters and simulation codes will be freely available.

WP4:

D4.1 and D4.2 are public. Others are confidential since they will contain information regarding industrial processes of the end-users.

WP5:

Deliverable D5.1 will be public. Deliverables D5.2 and D5.3 are confidential since they will contain information of end-users industrial processes.

All the papers in journals, conferences, newsletters and simulation codes will be freely available.

WP6:

Deliverables D6.2, D6.3 and D6.4 will be public. Deliverables D6.1 and D6.5 are confidential.

All the papers in journals, conferences, newsletters and simulation codes will be freely available.

WP7:

Final report D7.4 will be open access

Selected data will be open access, qualified by need to protect confidentiality regarding industrial processes

WP8:

D8.3a and 8.5 are public.

WP9:

Various data will be provided to users and visitors of the Crowdhelix platform (i.e. the "front end" interface) in accordance with the Terms of Service of the platform. Users are given the opportunity and the tools to restrict access to the content they post on the platform, or to make it accessible to the public.

2. How will the data be made accessible (e.g. by deposition in a repository)?

(all dataset in ASTEP will be stored in ASTEP teams and repositories like Zenodo. Besides, they can be published, for example, in journals allowing dataset publication)

The public deliverables will be stored in the ASTEP website and Zenodo repository. It will be freely accessible in both repositories.

Publications, all in open access mode, will be available from the own journals/editorial and also from the ASTEP website and Zenodo repository.

All public datasets in ASTEP will be stored in ASTEP teams and repositories like Zenodo. Those that can be published, will be submitted to journals allowing dataset publication

WP9:

Via <http://crowdhelix.com> - the majority of data require the user to sign up for an account to be able to view it, however some data are made public in accordance with the choices made by the users providing the data. (CHX)

3. What methods or software tools are needed to access the data?

(software to read the data)

Conventional office suits like Acrobat, Office365, LibreOffice, OpenOffice or Google docs and conventional programming languages like Matlab. Python or OpenModelica. Other commercial programs are envisaged to be used within the program such as ANSYS for numerical simulations. Besides, proprietary software will be incorporated such as in data acquisition and control systems.

4. Where will the data and associated metadata, documentation and code be deposited?

Microsoft Teams, Website and Zenodo. Codes are envisaged to be deposited in GitHub.

5. If there are restrictions on use, how will access be provided?

Confidential documents are stored in ASTEP teams. Partners can access the platform after password-protected authentication.

WP9:

The majority of data require the user to sign up for a CrowdHelix account, and to accept the Terms of Service and Privacy Policy, to be able to view it. To sign up, users must authenticate themselves as a representative of a relevant organisation.

6. How will the identity of the person accessing the data be ascertained?

(answer only if you foresee access different from Teams, Zenodo, Website or Social media)

WP9:

The email addresses of each user are validated against the domain of their organisation and are then confirmed via a standard "confirmation email" with a link that must be clicked before access can be granted.

Making data openly interoperable

1. Are the data produced in the project interoperable, that is allowing data exchange and re-use between researchers, institutions, organisations, countries, etc. (i.e. adhering to standards for formats, as much as possible compliant with available (open) software applications, and in particular facilitating re-combinations with different datasets from different origins)?

WP1, WP3, WP5, WP6, WP7:

Yes (for public data).

WP9:

No within the platform, except for where data must be provided to Data Subjects in an interoperable format in accordance with data protection legislation.

2. What data and metadata vocabularies, standards or methodologies will you follow to make your data interoperable?

(if there are not metadata vocabularies, please indicate that variables will be easily identifiable and add a glossary id required)

WP1 to WP8:

The used vocabulary is standard. Variables will be easily identifiable. A glossary will be always included with datasets.

WP9:

Not applicable.

3. Will you be using standard vocabularies for all data types present in your data set, to allow interdisciplinary interoperability?

WP1-WP8:

Yes.

WP9:

Not applicable.

Increase data re-use

1. How will the data be licensed to permit the widest re-use possible?

WP1-WP8:

License of type BY-NC-ND 4.0 (Attribution + Noncommercial + NoDerivatives) or such as Creative Commons.

Background data regarding processes will remain the property of the process owners.

WP9:

Not applicable

2. When will the data be made available for re-use? If an embargo is sought to give time to publish or seek patents, specify why and how long this will apply, bearing in mind that research data should be made available as soon as possible.

WP1-WP9:

Public deliverables will be available once approved by the agency.

The project has an important innovative component and IPR actions are foreseen. Tentatively an embargo of up to 6 months to prepare the corresponding patent should be envisaged. Nevertheless, at the current state of the project is not possible to infer the embargo period. The Consortium will also look for mentoring through the BOOSTER services provided by the Commission to maximize the impact of innovation.

3. Are the data produced and/or used in the project useable by third parties, in particular after the end of the project? If the re-use of some data is restricted, explain why?

WP1-WP9:

Public deliverable can be used by third parties even after the project.

Confidential deliverables and datasets are kept within the consortium.

Regarding WP7:

Data used in report D7.4 will be available for use after the end of the project, subject to confidentiality of commercial processes.

4. How long is it intended that the data remains re-usable?

WP1-WP8

Whenever possible data will be available without limitation. In several tasks, this can be limited to 5 years after the project.

Regarding WP7:

Data will be available from project partners for 5 years after the project finishes.