Pan-European interoperable AC-DC HYbrid electricity NETworks

D1.2: Data Management Plan (Initial version)

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List of Acronyms and Abbreviations

Abbreviation	Description
AC	Alternating Current
DC	Direct Current
DMP	Data Management Plan
DSO	Distribution System Operator
EC	European Commission
EU	European Union
FAIR	Findable, Accessible, Interoperable, Re-usable
GDPR	General Data Protection Regulation
HVDC	High Voltage Direct Current
ISSN	International Standard Serial Number
KPI	Key Performance Indicator
LVDC	Low Voltage Direct Current
MVDC	Medium Voltage Direct Current
ORDP	Open Research Data Pilot
PMU	Phasor Measurement Unit
SSL	Secure Socket Layer
ToC	Table of Contents
TSO	Transmission System Operator
WP	Work Package

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Executive summary

HYNET project primary aim is to develop innovative operational tools for power dispatch, voltage control, and security within these grids, addressing the current challenges in transitioning from traditional AC systems to hybrid ones that integrate DC components. The project introduces new control algorithms, protection mechanisms, and grid-forming capabilities to manage the increasing penetration of renewable energy sources and power electronics.

The present document is the first version of the Data Management Plan (DMP). Data management within a research and innovation project is essential and the DMP is the document that regulates the standards on how the data is obtained, used, and stored. Additionally, it describes how the data will be available for other researchers across the world. The DMP is the key document presenting the data management processes to be carried out in WP1.

The HYNET DMP outlines how the data collected during the HYNET project will be handled, not only while the project is running but after its completion too. This deliverable also describes which standards and methodologies will be followed for the efficient collection of data and the appropriate dissemination of them.

The F.A.I.R. (Findable, Accessible, Interoperable, Re-usable) Data Management guidelines, outlined by EC for Horizon Europe projects, along with EC's DMP template, were followed for the formation of this deliverable. A first version of the project's DMP (*Data Management Plan* as a deliverable) will be submitted covering the first 6 months of the project. The DMP should be updated over the course of the project, whenever significant changes arise, such as new data and/or changes in consortium policies.

The Data of the HYNET project will be generated via accessible information, project partners' contributions, external evaluators' activities, third party beneficiaries and the demonstration cases.

All the sets of data produced will be anonymized for impact assessment and research purposes. All the personal data will be treated in line with the REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 April 2016 and it will be accessible for authorized users only (validated via authentication processes).

This report illustrates the data handling framework within the HYNET project.

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1. Introduction

Research and innovation projects like HYNET generate substantial amounts of data, originating from diverse sources such as social science studies, laboratory experiments, field research, and observations. However, after the project is completed and the data analysis is concluded, much of this data often remains unutilized. Therefore, it is crucial for researchers involved in the HYNET project to consider how the data they generate can be effectively managed and made accessible for future use by other researchers worldwide. This is the core objective of the DMP.

1.1 Purpose of the document

The DMP serves as a strategic framework for organizing, managing, and optimizing access to research data collected throughout the project. As a dynamic document, it will be continuously updated to reflect evolving data management practices during the different phases of HYNET. It details the approach for handling research data both during and after the project's completion, ensuring systematic documentation and accessibility.

The DMP outlines key aspects such as the types of data generated and collected, the standards and methodologies applied, the procedures for data preservation, and the mechanisms for sharing datasets to facilitate validation and reuse.

The HYNET DMP specifically covers:

- Management of research data during and after the project.
- Data types and formats that will be generated or collected.
- Applicable methodologies and standards.
- Accessibility measures to ensure open data sharing.
- Strategies for data security and protection.

Additionally, it provides an overview of the datasets expected to be produced. Future versions of the DMP will expand on these elements, incorporating more detailed descriptions of practical data management procedures implemented within HYNET.

1.2 Target audience

The intended audience for this document includes:

- The European Commission.
- The EU Parliament.
- HYNET project partners and the Advisory Group.
- Horizon Europe projects and other energy-related initiatives engaged in clustering activities.
- Organizations and experts involved in the HYNET demonstration cases.
- Relevant public and private sector entities.

1.3 Document structure

The deliverable is organised as follows:

- Section 2 gives an overview of how data management is currently handled in Horizon Europe program, giving insights regarding data types and how compliance with GDPR is being granted.
- Section 3 provides details how data are handled within the context of HYNET project, giving details of the various data types that are being handled within the project.

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- Section 4 highlights how HYNET project output in terms of data is related to Open Science.
- Section 5 gives detailed information about FAIR data within HYNET project.
- Sections 6, 7, 8 cover the aspects of HYNET project regarding allocation of data resources within the project, project data security and project ethics accordingly.
- Finally, Section 9 gives the concluding remarks regarding this version of HYNET project's Data Management Plan.

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2. Data Management in Horizon Europe

The Data Management Plan (DMP) outlines the methodologies for collecting, generating, and processing data throughout the lifecycle of a research project. As part of the European Commission's commitment to promoting Open Science policies and practices, the inclusion of a DMP is a mandatory requirement for all projects that involve data under Horizon Europe:

"Under the Horizon Europe all projects that generate research data have to submit a DMP (at the latest, six months after the start of the project), deposit such data in a 'trusted' repository and provide access to them, under the principle 'as open as possible, as closed as necessary'. There are also a number of requirements concerning the bibliographic and administrative metadata of deposited data, which also have to be made openly accessible to enhance findability and facilitate reuse." [1]

Initially, a basic DMP must be incorporated into the project proposal, while funded projects are required to submit a detailed DMP as a formal deliverable within six months of the grant agreement being signed. This deliverable provides a concise guide on the essential components that should be addressed when preparing the DMP for a Horizon Europe project.

The primary objective of establishing a DMP is to ensure that research data remains accessible and valuable for future use. The plan specifies the measures that will be put in place to optimize data availability and facilitate its reuse in subsequent research or applications. Consequently, developing a DMP tailored to the specific needs and structure of a project is essential.

To enhance clarity and understanding, the following table (Table 2.1) defines key terms relevant to this document.

Table 2.1: Clarification of terms

Research data	Research data is the evidence that underpins all research conclusions (except those which are purely theoretical) and includes data that have been collected, observed, generated, created, or obtained from commercial, government or other sources, for subsequent analysis and synthesis to produce original research results. These results are then used to produce research papers and submitted for publication.
Open research data	Openly accessible research data can typically be accessed, mined, exploited, reproduced, and disseminated, free of charge for the user.
Open access	Open access is understood as the principle that research data should be accessible to relevant users, on equal terms, and at the lowest possible cost. Access should be easy, user-friendly and, if possible, Internet-based.
Metadata	Metadata is data used to describe other data. It summarises basic information about data, which can make finding and working with instances of data easier.
Research data repositories	Research data repositories are online archives for research data. They can be subject based/thematic, institutional, or centralised.

Ensuring that scientific research data is lawfully processed involves adhering to key principles that make the data discoverable, accessible, understandable, usable beyond its initial purpose, and

[1]https://erc.europa.eu/sites/default/files/document/file/ERC_info_document-Open_Research_Data_and_Data_Management_Plans.pdf

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interoperable according to established quality standards. Research data should be structured in a way that allows it to be easily located, assessed, and reused across different contexts.

HYNET's approach to data management aligns with the Guidelines on FAIR Data Management in Horizon Europe, published by the European Commission's Directorate-General for Research & Innovation. These guidelines define four fundamental principles that govern how research outputs should be organized and handled to enhance their accessibility, usability, and interoperability. Specifically, research data should be:

- Findable
- Accessible
- Interoperable
- Reusable

This ensures that researchers can effectively locate and utilize data for further studies within their respective fields.

The FAIR principles do not dictate specific technologies, standards, or implementation methods; rather, they provide a conceptual framework for structuring research data. The European Commission offers a FAIR Data Management Template, which is designed as a flexible guideline rather than a rigid technical standard. The template consists of key questions that should be addressed in varying levels of detail based on the specific requirements of a project.

A DMP can be created to outline the overall approach for a research project. However, if specific datasets present unique challenges—such as restrictions on data openness—these aspects should be explicitly detailed. The DMP template suggests addressing the following key areas:

- Data Summary
- FAIR Data
- Other Research Outputs
- Resource Allocation
- Data Security
- Ethical Considerations
- Other Issues

Each of these categories includes specific questions that need to be answered to ensure a comprehensive data management strategy. The DMP is designed as a dynamic document, allowing for periodic updates as the project progresses and significant changes occur. This adaptability ensures that information can be refined and expanded as necessary.

2.1 General Data Protection Regulation (GDPR)

The General Data Protection Regulation (GDPR) is a legal framework established by the European Union to uphold the privacy and security of individuals' personal data. It sets stringent guidelines on how data should be collected, processed, stored, and shared. For any project funded by the EU, compliance with GDPR is crucial, and it directly influences the DMP by outlining essential principles that govern responsible data handling.

To align with GDPR regulations, the DMP must incorporate key principles such as lawfulness, fairness, transparency, data minimization, accuracy, purpose limitation, storage restriction, integrity, and confidentiality. These guidelines help ensure that all aspects of data processing respect individuals' rights while maintaining high standards of security and ethical responsibility. During the initial planning phase, the HYNET consortium carefully evaluated the impact of GDPR regulations on the

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project. The datasets handled in the project primarily relate to network configurations, testing protocols, and system instrumentation, which are unrelated to personal data. To ensure full compliance, HYNET follows robust data protection policies that are aligned with EU regulations, the GDPR, and national data protection laws. These measures are embedded within the ethical framework and DMP, ensuring all partners adhere to strict guidelines for responsible data handling.

To reinforce GDPR compliance, the HYNET project follows a Privacy by Design strategy. This means that privacy and security measures are not added as an afterthought but are integrated from the start into all technological developments. Rather than prioritizing mass data collection or unrestricted data sharing, the project ensures that privacy safeguards are embedded into the technological infrastructure itself. Privacy by Design ensures that systems are built with strong protective mechanisms that minimize risks and prevent unauthorized access or misuse of sensitive information.

From a broader ethical standpoint, Privacy by Design emphasizes the responsibility of technology developers to create solutions that align with public expectations. Privacy-enhancing technologies should remain within ethical boundaries, reflecting societal norms and adapting to emerging privacy concerns. Additionally, transparency plays a key role in public trust. Keeping stakeholders informed about privacy measures and ensuring open dialogue with the public prevents misunderstandings and ensures that technological advancements do not create unintended security risks.

Furthermore, the DMP should address the rights of data subjects, such as the right to access, rectify, erase, and object to the processing of their personal data. By clearly stating how the project will handle data subject requests and outlining the procedures for managing data breaches, the DMP demonstrates compliance with the GDPR, fostering trust among stakeholders and ensuring the ethical management of personal data throughout the project lifecycle.

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3. Project Data Management Overview

In accordance with the Guidelines on FAIR Data Management in Horizon Europe, an effective DMP is essential for ensuring proper data organization and handling throughout the project. The following section outlines the different categories of data that will be produced during the course of the HYNET project:

- **Data generated from accessible information,** including reports and publications related to key topics in the power industry, sector advancements, and other areas relevant to the project's objectives;
- **Data generated from project partners activities**, such as evaluation reports, expert reviews, discussion sessions, priority-setting efforts, technical data processing, business process development, and overall assessments that contribute to achieving project goals;
- **Data generated involving third party beneficiaries and use cases**, which may include submitted project details, interviews, presentations, and other contributions under specific conditions.

The HYNET project will collect data through various channels, engaging partners, stakeholders, and external contributors. A systematic approach will be used to gather, store, and process information submitted by project participants. This collected data will serve three primary purposes:

- evaluation of deliverables and proposals;
- impact assessment;
- research.

3.1 Types and formats of artifacts generated / collected

To provide an overview of the different data sets that will be produced in the HYNET project, the following Table 3.1 shows the data type, the related WP number, and the format, in which the data will be presumably stored.

Table 3.1: Artefacts overview

#	Artefact type	Short description	WP#	Format
1	Research item	Models and Meta models, Policies, Questionnaires, Deliverables, Publications, KPIs	1-6	.xls, .csv, .txt, .docx, .pdf
2	Software	Code, APIs, Libraries, Dashboards, Microservices	3,4	.xls, .csv, .txt, .docx, .pdf, .exe, .bat, .py,
3	Dataset	Synthetic data, Demo data, Lessons learned, Measurements	5	.xls, .csv, .txt, .docx, .pdf, .png, .mp4

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3.2 Project artifacts and access rights

The following tables (Table 3.2, Table 3.3, Table 3.4) present the status and consensus within the Consortium with regards to identified artefacts and their access rights. It is provisioned that those tables are a recurring exercise, and all future updates and additions will be documented in the final version of the DMP under deliverable D1.4.

Table 3.2: Partners' Research Item provision

Partner Name	Artefact Description	Dissemination level	Format
UCY	Deliverable 2.1	Public	.pdf
UCY	Deliverable 5.4	Public	.pdf
UCY	HVDC model in Simulink	Confidential	.slx
CIRCE	Deliverable 3.3	Public	.pdf
CIRCE	Grid forming model on RSCAD	Confidential	.rtfx
CIRCE	Inertial algorithm implemented on PDC	Confidential	IEC61131 code
INESC TEC	Deliverable 3.4	Public, worldwide	.pdf
INESC TEC	Deliverable 4.2	Public, worldwide	.pdf
SGI	Deliverable 4.3	Public	.pdf
SGI	Publication on MVDC architectures	Public	.pdf
SGI	Design scripts and simulation models of MVDC networks and components	Confidential	.slx, .m, .xlsx
EDF	deliverable 2.2	Public	.pdf
BME	Deliverable 6.2	Public	.pdf
GEPC	Inverter model with grid forming capability	Confidential	tbd
GEPC	Synchro condensator model	Confidential	tbd
GEPC	Energy management system model	Confidential	tbd
GEPC	State of the art of hybrid AC/DC network	Public	tbd

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Table 3.3: Partners' software provision

Partner Name/owner	Artefact Name	Artefact Description	Format / Type	End User	Possibility of integration and reuse	Standards and metadata
UCY	Inertia estimation software (Tool#12)	Tool that will be developed within Task 3.4 (WP3)	.exe	TSO	Under certain license agreement	IEEE C37.118
UCY	HVDC controller for the provision of adaptive inertia (Tool#13)	Tool that will be developed within Task 3.4 (WP3)	.exe		Under certain license agreement	
UCY	Cascading-aware (Tool #9) CBA of AC/DC architectures	Tool that will be developed within Subtask 3.2.3 (WP3)	.exe	TSO	Under certain license agreement	
CIRCE	Grid forming control algorithms and grid following integration (HA#2)	Tool that will be developed within Task 3.3 (WP3)	.rtfx	Renewable energy generation operator	Under certain services/license agreement	
CIRCE	Inertia compensation scheme (Tool#2)	Tool that will be developed within Task 3.4 (WP3)	IEC61131 code	TSO, IED Manufacturer	Under certain license agreement	IEEE C37.118
	Tool#	Tool that will be developed within Task 3.1 (WP3)				
		Tool that will be developed within Task 3.4 (WP32				
INESC TEC	Power Dispatch and Voltage Control Tool - Optimal Power Flow (Tool #1)	Optimal Power Flow software for hybrid AC/DC distribution grids	Python/C	DSO /	Under certain license agreement	

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INESC TEC	Computational suite for steady-state and dynamic analysis (Tool #5)	Steady-State power flow solver for hybrid AC/DC distribution grids; Software Library (Computational Blockset) for Dynamic studies specialized for hybrid AC/DC grids	Python/C; MATLAB/Simulink	DSO	Under certain license agreement / Open source	
INESC TEC	Reliability and resilience analysis tool for HVDC, MVDC, and LVDC integration (Tool #6)	A Monte Carlo Simulation (MCS) based tool to analyse the reliability and resilience of MV/LV hybrid networks using optimization techniques to derive system reliability and resilience indices to support grid planning	Python/C	DSO	Under certain license agreement	
INESC TEC	Grid planning tool for HVDC, MVDC, and LVDC integration (Tool #7)	Framework for defining optimal expansion plans for hybrid AC/DC including detailed criteria in terms of investment and operation costs, and renewable energy integration, reliability, and resiliency.	Python/C	TSO/DSO	Under certain license agreement	
INESC TEC	Islanding, Service Restoration, and Network Protection for Hybrid AC/DC Grids (Tool #11)	Protection management; Islanding, Energy Management in islanding operation; Service Restoration.	Python/C	DSO	Under certain license agreement	
SGI	OpTEAsoft Grid (Tool #4)	Add the following features: -Storage behaviour modelling -Multi-energy modelling -Improve results post-processing -Generation of time series of contingencies -Use TYNDP 2024 instead of 2022	Python software .xls inputs & outputs .json data	TSO, developers	Under certain license agreement	

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Table 3.4: Partners' dataset provision

Partner Name	Name	Dataset description	Current Dataset Status	Format	End User	Existence of similar data	Possibility of integration and reuse
UCY	PMU data	Data from emulated and real PMUs obtained from the Cyprus power system. The dataset will constitute of voltage and current phasor measurements, frequency and rate of change of frequency	To be generated	.xls	TSO	Yes	Yes
UCY	Cascading analysis data	Data generated from cascading simulations on the Cyprus power system. The dataset will include power system measurements (voltage, current, etc.) as well as sequence of protection operations (e.g., UVLS, OLC, etc.)	To be generated	.xls	TSO	Yes	Yes
SGI	MonIta model	Grid model(s) and energy scenario(s) from TYNDP 2024 for Demo 2 (Montenegro-Italy). Content: - Power plants (generators, loads, storages) - Grid components (AC lines, DC cables, AC/DC converters, transformers) - Hydrogen plants (electrolysis, fuel cells / H2-fire power plants, H2 storage) - Hydrogen pipelines	Existing: Detailed European grid model and tool to build reduced model. Energy scenario for all European countries (TYNDP 2022), and tool to regionalize these scenarios.	.xls .json	TSO, developers	Yes	Yes

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3.3 Expected size of the data

The project is expected to produce various research outputs, including datasets, which will encompass the results of technological advancements, demonstration services, and related innovations. Additionally, it will generate scientific publications, proposals for new services, and dissemination materials aimed at sharing findings with a broader audience. Given the project's scale, scope, and complexity, accurately predicting the total volume of data at this stage is not feasible. However, as the project progresses, a clearer estimation of the data size and storage requirements will be established.

3.4 Data protection

Where applicable, datasets will be anonymized to support impact evaluation and research while preserving privacy. The collection of personal data within the project will be strictly limited to project submissions, and participants will be required to provide informed consent before their data is processed. To safeguard identities, anonymous coding will be used, ensuring that personal details remain protected. The mapping between real identities and assigned codes will be securely maintained by project partners, who will restrict access to these records. Any necessary application links will be encoded, allowing external evaluators to access the data only through the anonymized system. If data needs to be shared with non-EU partners, prior approval from the relevant Data Protection Office will be required—unless the countries involved already have sufficient privacy and data protection measures in place.

Copies of all notifications and approvals related to personal data processing from the responsible institutional Data Protection Office will be made available to the European Commission upon request. Additionally, all personal data will be encrypted and securely stored to prevent unauthorized access. The project’s data protection procedures will fully comply with Regulation (EU) 2016/679, which safeguards the rights of individuals regarding personal data processing and ensures free data movement. Compliance with the now-repealed Directive 95/46/EC will also be maintained where applicable.

3.5 Reusability of existing data

Throughout the project, data will be continuously gathered; however, there will be no integration or use of pre-existing research datasets or personal data. Additionally, data sharing with non-EU entities outside the consortium is not planned as part of the project activities.

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4. HYNET Project and Open Science

The European Commission (EC) has introduced the ambitious European Open Science Cloud to establish a reliable environment for hosting and processing research data, thereby reinforcing the EU's global leadership in science. In alignment with this initiative, HYNET is fully committed to operating under the principle of "as open as possible" and closely adheres to the Open Science Policy set forth by Horizon Europe. As a result, HYNET will incorporate suitable open science practices into its methodological approach.

By adopting a co-creation framework, the project ensures that consortium partners are actively engaged in a reciprocal process. This collaboration leverages their varied experiences and viewpoints to enrich decision-making, while also ensuring accountability among stakeholders as they tackle emerging challenges. A key component of effectively responding to end-users' needs is the early and accurate identification of, and engagement with, stakeholders from the very start of the project. Drawing inspiration from Responsible Research and Innovation (RRI) and Open Innovation principles, HYNET will deploy co-creation strategies and agile methods to maintain social acceptance of the project's open innovation package. Through approaches such as user testing, collaborative workshops, qualitative research, and informational sessions, the project will capture real-world user requirements and constraints. These insights will then be integrated into technology and service design, ensuring that both current and future business models align with genuine market demands. In line with GDPR guidelines, any data gathered from participants during co-design activities and field trials will be pseudo-anonymized prior to processing.

Directly involving citizens in project activities boosts scientific literacy and expertise by offering volunteers enhanced access to, and understanding of, scientific information—potentially steering some individuals toward careers in science or management. Professional scientists have noted that citizen science volunteers, particularly younger adults, often demonstrate a keen interest in, and aptitude for, scientific research, thereby expanding the talent pool for fields like conservation science, natural resource management, and environmental protection.

Scientists and engineers can further disseminate knowledge within their professional networks by sharing their work and initiating discussions on topics of interest through various social channels. The information they provide, along with the example they set, can motivate others to participate or modify their behaviour. It is generally more effective for individuals to adopt new practices based on examples set by colleagues and friends rather than through broader public information campaigns.

All consortium partners are dedicated to using the Open Research Europe open access publishing platform for their scientific outputs. This platform enables rapid publication and supports key principles of research integrity, reproducibility, transparency, and open science. To guarantee open access to published work, partners can opt for either self-archiving (known as "green" Open Access) or open access publishing (referred to as "gold" Open Access). Under the self-archiving model, the final peer-reviewed manuscript is placed in a chosen repository, ensuring open access within six months at most. Alternatively, publications may appear in open access journals or in journals that provide the option for individual articles to be freely accessible. This strategy aligns seamlessly with the "Open" model that will be used to share project outcomes. Further details about both the process and the online platforms employed can be found in subsequent sections.

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5. FAIR Data

HYNET project supports the reuse of research data and follows FAIR principles. FAIR represents a set of guiding principles to make data **Findable**, **Accessible**, **Interoperable**, and **Reusable**.

The international FAIR Principles have been formulated as a set of guidelines for the reuse of research data. Data must be of quality that makes them accessible, findable, and reusable.

- **Findable:** data has a unique, persistent ID, located in a searchable resource, and documented with meaningful metadata.
- **Accessible:** data is readily and freely retrievable using common methods and protocols, metadata is accessible even if the data is not.
- **Interoperable:** data is presented in well-established standard formats, vocabularies, and languages.
- **Reusable:** data has clear licenses, and accurate meaningful metadata conformity to relevant community standards and identifying its content and provenance.

5.1 Making data findable, including provisions for metadata

This document launches the data management plan to support the effective collection and integration of the HYNET project's data. Storage, processing and sharing (among project participants) will occur via data exchange platforms, whereas interaction with the wider public will be achieved through the official project website. Also, data will be stored at the project's repository and will be kept for minimum 1 years after the end of the project. Raw data with personal information will be deleted as soon as the anonymised information is extracted.

A naming convention will include a concise description of contents, the host institution collecting the data and the month of publication.

Version numbering will only be an issue if a participant requests withdrawal of their data in which case a version number will be added to the filename.

No specific standards or metadata have been identified for the time being for the proposed datasets.

Data will be anonymised meaning that data will not identify any individuals and therefore real names of participants will NOT be distributed.

Data will be shared only in relation to publications (deliverables and papers). As such, the publication will serve as the main piece of metadata for the shared data. When this is not seen as being adequate for the comprehension of the raw data, a report will be shared along with the data explaining their meaning and methods of acquisition.

5.1.1 Discoverability of the data

To be able to use the data generated by the project it is essential to integrate data from the participants in the open calls and the activities undertaken by project partners. Considering the FAIR data principles (Wilkinson et al., 2016)[2] (meta)data should:

- be assigned to a globally unique and persistent identifier;
- contain enough metadata to fully interpret the data, and
- be indexed in a searchable source.

[2] Wilkinson, M., Dumontier, M., Aalbersberg, I. et al. The FAIR Guiding Principles for scientific data management and stewardship. Sci Data 3, 160018 (2016). https://doi.org/10.1038/sdata.2016.18

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By applying these principles data become retrievable and include their authentication and authorisation details.

5.1.2 Data identification mechanisms

All documents associated project will be identified with a project name and unique and persistent document type designator and number that will be given to the coordinator for the submission to the EC. Versioning of the document should be part of the document name and title.

As per the documents related to project activities and/or deliverables, the tasks or deliverables number will be used to identify the document followed by a brief title of the activity or deliverable.

Example

- HYNET - D1.2 - Data Management Plan v1.00

5.1.3 Naming conventions used

Each set of data produced (dataset, deliverables, etc.) will be named in a uniform way and will include a table with a version control.

The recommendations to name documents of the project are as follows:

- Choose easily readable identifier names (short and meaningful)
- Do not use acronyms that are not widely accepted
- Do not use abbreviations or contractions
- Avoid language-specific or non-alphanumeric characters
- Add a two-digit numeric suffix to identify new versions of one document
- Dates should be included back to front and include the four-digit years: YYYYMMDD

For deliverables:

[*ProjectName*] - [*DeliverableNo*] - [*DeliverableTitle*] [*vA.BB*]

⇨ **example:** HYNET - D1.2 - Data Management Plan v1.00

For datasets:

[*ProjectName*] - WP[WP_*No*] - P[*Pilot_No*] [activity name or *short description of activity*]

⇨ **example:** HYNET - WP5 - P1.3 Results of demonstration performance

Version should be stated in **A.BB** format, where:

- **A** refers to a major version of the deliverable (Submission to Commission), and
- **BB** refers to a minor version of the deliverable for updates during the preparation phase

5.1.4 Clear versioning of the document

Only documents created by the consortium will be versioned. For this purpose, templates include three descriptors to identify the versions and status of the documents:

Table 5.1:Proposed Document History Table overview

Version	Date	Changes	Contributor(s)

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Moreover, partners, following the recommendations included in section “Naming conventions” will identify the different versions by using a two-digit number following the descriptor DRAFT. A document reviewed by another partner should be returned to the principal author by including [**rev**] + **[acronym of the organisation**]. Only the principal author will change the draft number and will add the word FINAL to documents ready to be sent to the EC or those to be used as final versions.

5.1.5 Standards for metadata creation (if any)

Basic metadata will be used to facilitate the efficient recall and retrieval of information by project partners and external evaluators and contribute to easily find the information requested. To this end, all documents related to the project have to include in the front-page information about author(s) & editor(s), WP, dissemination level and version.

To support the completeness of metadata, the project provides a metadata template to all stakeholders. The template will be a living document that might be expanded to fit project specific requirements.

Table 5.2: Metadata template for HYNET datasets

#	Field	Description
1	Title	A name given to the resource
2	Creator	An entity primarily responsible for making the resource
3	Subject	The topic of the resource
4	Description	e.g., abstract, table of contents, graphics, ...
5	Publisher	Only for published items
6	Contributor	Entities that contributed to the making of the resource
7	Date	The termination of the data collection period
8	Type	[dataset, article, questionnaire, ...]
9	Format	File format of the resource
10	Identifier	e.g., ISSN if your item has been published
11	Source	Which tools were used to collect the data
12	Language	A language of the resource
13	Relation	A related resource.
14	Rights	Information about rights held in and over the resource.

In addition to the dataset’s metadata document, dataset providers are compelled to attach additional documents such as:

1. A description of the study
2. Method of research;
3. Applied questionnaires;
4. Data documentation / usage manual;
5. Any other information that might be of interest to a data user.

5.2 Making data openly accessible

Where possible data will be made available subject to ethics and participant agreement. However, the personally identifiable nature of the data collected within HYNET means that in most instances it

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would be difficult to release collected data. Where data is made available, we will do so using the project's file repository hosted in coordinator's premises.

Prior to release, a requesting party will need to contact the Project Coordinator describing their intended use of a dataset. The Project Coordinator will send a terms and conditions document for them to sign and return. Upon return, the dataset will be released. Documentation will be included with the release of the data.

HYNET will follow Green Open Access strategy to its scientific publications, which will be agreed during the first months of the project execution. This strategy is directly related to the "Open" paradigm that will be used for publishing project results. No personally identifiable data will be shared or remain with the partners after the project ends without prior consent. If individuals choose to withdraw from a user-trial, their personal data will be removed from the databases. Open access is supported by the dissemination and exploitation approach of HYNET results.

Table 5.3: Artefacts' Types

#	Artefact type	Short description	WP#	Formal (indicative)
1	Research item	Deliverables, Publications, (...)		
2	Software	Code, APIs, Libraries, (…)		
3	Dataset	Trial data, Lessons learned, (…)		

5.2.1 Methods or software needed to access the data

No specific software tools will be needed to access the data, since anonymous data sets will be saved and stored in word, pdf or excel to facilitate its exploitation and guarantee their long-term accessibility.

5.2.2 Deposit of data, associated metadata, documentation and code

Data will be deposited and secured on HYNET repository and additional instance of all data on coordinator's account.

5.3 Making data interoperable

The concept interoperable demands that both data and metadata must be machine-readable and that a consistent terminology is used.

5.3.1 Interoperability of data assessment

Partners will be responsible of storing the data in a comprehensive format and adapted to the real and current needs of the possible practitioners interested in using, merging, or exploiting the data generated throughout the project. The assessment of data interoperability will be updated in future reviews to guarantee the HYNET data fits the needs of a specific scenario (such as data infrastructures, interests, or purpose of data.

5.3.2 Vocabulary use

The vocabulary used in the project is a very standard and common language and won't represent any barrier for data interoperability or re-use.

5.4 Making data reusable

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For data to be re-usable, it is -generally- considered that meta(data) have a plurality of accurate and relevant attributes and that they are released with a clear and accessible data usage license. Moreover, it is considered that (meta)data are associated with their provenance and that they meet domain-relevant community standards.

Note that the overall management of knowledge and the provisioning for the establishment of the related Intellectual Property Rights is dictated in detail under HYNET's Grant Agreement and the consortium agreement stipulating, among other, or the ownership of the background and the foreground knowledge, as well as for the commercial exploitation of the project's results.

5.4.1 Data quality assurance process

The project coordinator will be responsible of assuring the quality of the data by making sure dataset follow the FAIR principles included in this plan, and that data is updated.

Personal data processing will be done following the EU, national and international laws considering the "data quality" principles listed below:

- Data processing is adequate, relevant, and non-excessive;
- Accurate and kept up to date;
- Processed fairly and lawfully;
- Processed in line with data subjects' rights;
- Processed in a secure manner;
- Kept for no longer that necessary and for the sole purpose of the project.

Data quality assurance process will be led in accordance with the REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 April 2016[3] on the protection of natural persons regarding the processing of personal data and on the free movement of such data.

[3] https://eur-lex.europa.eu/legal-content/EN/AUTO/?uri=celex:32016R0679

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6. Allocation of resources

6.1 Data management responsibilities

Data will be stored at the HYNET online repository and will be kept for 1 year after the end of the project. Where requested, data will be kept for 2 more years. The handling of the repository on behalf of HYNET as well as all data management issues related to the project fall in the responsibility of the coordinator.

As for the publications, where the analyses of the empirical research data will be presented, the consortium will publish them in scientific journals that allow open access. The costs related to open access will be claimed as part of the Horizon Europe grant.

Regarding the data resulting from the activities of the project, each WP leader will be responsible for the storage and compliance of the data and then for uploading in the HYNET online repository, or other storage systems to share the information of the project.

The HYNET coordinator assisted by the WP leaders will be responsible for updating this document and develop a strategy to encourage:

- the identification of the most-suitable data-sharing and preservation methods;
- the efficient use of data assuring clear rules on its accessibility;
- the quality of the data stored and;
- the storage in a secured in a user-friendly interface.

6.2 Cost of potential value of long-term preservation

As stated in previous section, the costs of data storage and maintenance are not going to require extra funding once the project ends. As per the value of the data, it is important to consider that the topics covered by the project respond to a current need of the logistics sector and customers' needs. Therefore, data coming out of this project will have a direct impact in the coming years but might not be of relevance as the challenges are being tackled or replaced by other priorities.

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7. Data Security

HYNET project applies technological and organisational measures to secure processing of personal data against publishing to unauthorised persons, processing in violation of the law and change, loss, damage, or destruction.

- **Information security**: SSL (Secure Socket Layer) certificates are applied. To ensure the appropriate level of security, the password for the account will exist on the platform only in a coded encrypted form.
- **Options for reading data**: the platform offers the possibility to make data available in a read-only or downloadable format, hindering the access to information by unauthorised users.
- **Back-up policy**: complete and redundant back-ups are done every week. Moreover, every time a modification is done an older version is saved.
- **Accidental deletion or modifications**: in case of a catastrophic event that implies the partial or complete deletion of the data sets, the data from the most recent back up will be automatically restored (back-up won't be older than 60 minutes). In case of accidental deletion or modification only the most recent document will be restored, so in case of accidental changes or deletion data can be easily recovered.
- **Deletion or modification of data by users**: only administrators have the rights to delete or modify the information included in the datasets.
- **Terms and conditions**: the repository platform have specific terms of use and conditions that must be accepted by all users of the platform.

All developments carried out during the project will be designed to safeguard collected data against unauthorized use and to comply with all relevant national and international regulations.

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8. Ethical Aspects

The HYNET consortium is aware of the ethical aspects pertinent to the scope of HYNET, which are addressed under the WP1, Task 1.3 Data Management, IPR, Legal and Ethics Monitoring. In particular, WP1 puts particular emphasis on two aspects pertinent to the scope of HYNET:

- the involvement of research participants and;
- the protection of the personal data to be collected and further processed for the purpose of HYNET project.

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9. Conclusions

This initial version of the data management plan provides the first information on the data to be collected and used throughout the project. The relevance of FAIR data has been described and its application on the used dataset was given. To provide for security and the handling of ethical aspects, a first outline of these topics was provided. As mentioned, the DMP is a living document and will be extended and updated through the whole project lifetime by all relevant partner and its final version will be reported in deliverable D1.4 in M30 (March 2027).

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