extended

nEXT gENERATION OF MULTIFUNCTIONAL, MODULAR AND SCALABLE SOLID STATE BATTERIES SYSTEM

D10.2 Data Management Plan (Initial)

EXTENDED project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101102278.

Document details	
Project Information	
Project Acronym/ Name:	EXTENDED
Project URL:	https://extendedproject.eu/
Project Type:	Research and Innovation Action (RIA)
EU CALL:	HORIZON-CL5-2022-D2-01-05 Next-generation technologies for High-performance and safe-by-design battery systems for transport and mobile applications (Batteries Partnership)
Grant Agreement No.:	101102278
Project Start Date:	01/06/2023
Project End Date:	31/05/2026
Document details	
Work package:	WP10 Project Management and Coordination
Deliverable:	D10.2 – Data Management Plan (Initial)
Due date of Deliverable:	30/11/2023 (EC review: 19/02/2025)
Actual Submission Date:	29/11/2023 (updated: 15/05/2025)
Name of Lead Beneficiary for this deliverable:	Report Author(s): Alvaro Sanchez; Bruno Rodrigues (ABEE)
Reviewed by:	Catarina Carneiro (INOVA+) Willar Vonk (TechConcepts)
Revision:	2.0
Dissemination Level:	PU - Public

Disclaimer

Copyright message

Document History			
Version	**Date**	**Comment**	**Modifications made by**
1.0	21/11/2023	First version	Alvaro Sanchez (ABEE)
2.0	20/03/2024	Second version	Alvaro Sanchez (ABEE)
3.1	15/05/2025	Revision according to EC guidelies	Bruno Rodrigues (ABEE)
2.2	16/05/2025	Document revision	Catarina Carneiro (INOVA+)
3.0	16/05/2025	Final version	Bruno Rodrigues (ABEE)

Glossary and Abbreviations	
WP	Work Package
EC	European Commission
FAIR	Findable, accessible, interoperable and reusable
IP Data	Intellectual-Property Data
BOM	Bill of materials
NDA	Non-Disclosure Agreement
DOI	Digital Object Identifier
DMP	Data Management Plan

LIST OF TABLES

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This deliverable outlines the basic Data Management Plan (DMP) for the EXTENDED project, which is supported by the European Union's Horizon Europe research and innovation programme under Grant Agreement number 101102278. The DMP's main purpose is to provide a thorough overview of all the datasets produced, gathered, and distributed across the project.

It also describes the data management techniques the EXTENDED Consortium uses for these datasets. The DMP, in its original version, describes the data's state, whether gathered, processed, or generated, together with the techniques and standards used. It also discusses the possibilities for data sharing and openness, as well as the Consortium's data curation and preservation plans.

The early version of the DMP covers both administrative and technical facets of data management and creates a wide structure and approach for controlling data inside EXTENDED. This includes FAIR principles-based data management policies. The DMP will be periodically updated as the project moves forward. These changes will clarify the policy elements and offer more information on the datasets being created and collected under the EXTENDED project.

2. OBJECTIVES

The objective of this Data Management Plan is to define the processes, responsibilities, and policies that govern data handling within the EXTENDED project, ensuring compliance with relevant legislation and best practices.

In particular, all data management activities will adhere strictly to the provisions of Regulation (EU) 2016/679 (General Data Protection Regulation - GDPR), safeguarding the privacy and rights of individuals while enabling the free flow of data within the consortium.

3. INTRODUCTION

The EXTENDED Data Management Plan aims to maximize the value and accessibility of data generated across all project activities by establishing internal standards and best practices for data stewardship.

Developed as part of Task 10.1 ("Administrative, legal and financial coordination"), this deliverable (D10.2) lays the groundwork for systematic data management, with subsequent iterations ("Data Management Plan (Mid-term)" (M18) and D10.4 "Data Management Plan (final).

EXTENDED brings together 19 partners collaborating across 10 Work Packages (WPs) spanning research, development, testing, and validation activities. The extensive data produced across these WPs requires coordinated management to ensure the data's reliability, reproducibility, and usefulness—ultimately supporting innovations in battery technology.

4. DATA MANAGEMENT PLAN

This part of EXTENDED describes the DMP Register Tool and its use in data collecting, documentation, and maintenance. It includes a dynamic register for continuous updates, new Intellectual Property Data rules, and a classification of expected data kinds. Ensuring effective and safe data management that is adaptive to the project's evolving requirements, the strategy also comprises a metadata management system handling data reference, ownership, contributors, and secrecy.

4.1 DATA MANAGEMENT ON EXTENDED

The approach implemented in EXTENDED to gain a comprehensive overview of the data generated throughout the project's duration is outlined in detail below. For enhanced clarity, the current status of all data identified in the Data Management Register is showcased in Table 1, which is labeled "EXTENDED Data Management Register Tool."

4.1.1 Data Management Methodology

All produced data will be recorded and documented in EXTENDED's "Data Management Register tool" on the project SharePoint to guarantee systematic management of data sets created during the project.

- This register is a dynamic record. Project partners will constantly update and fill it in. The EXTENDED SharePoint web platform provides access to this register.

- Before recording a new Intellectual Property Data Item, the administrative coordinator (INOVA), the technical coordinator (ABEE), and any partners involved in its creation (if any) should be informed.

- The data owner can then input the updated IP data into the Data Management Register Tool. Upcoming parts describe the required metadata for entering a new IP Data item, as shown by the several columns in Table 1, the structure of the Data Management Register Tool.

4.1.1.1 Data type and how to reference

A wide range of data kinds is expected to be generated inside EXTENDED, and the Data Management Register Tool will gather these. Listed below are now acknowledged data kinds and their corresponding shorthand notations. Extra data kinds could surface as the project develops, calling for the development of fresh acronyms.

Recognized Data Types (with their shorthand notations) as of now:

Experimental data (ED): Resulting from any lab experiment. The distinct data recording tools of every lab and the test details will determine the form and size of this data.

Models (M): Depending on the developing platforms used, this covers algorithms, simulations, scripts, or coding.

Data associated with design, such as:

- **Electronic designs (S)**: Schematic drawings, diagrammatic blocks, BOM (bill of materials), and the like.
- **Mechanical designs (C)**: 3D renderings, CAD drafts, etc.

Hardware prototypes (DEM): Relevant descriptive information and documentation will help preserve their digital representation, which is available in the project website's outcomes portion.

Software outputs (SW): Programs developed under the project's framework.

The preceding data classifications do not cover other document categories, such as academic papers or deliverables. While the latter are given their own Digital Object Identifier (DOI) and are regarded under Dissemination activities, the former have particular references and identifiers as specified in the project Grant Agreement.

4.1.1.2 Metadata in Data Management Register Tool

The accompanying Table 1 has been developed under the "Data Management Register Tool" to guarantee a thorough and methodical gathering of all data produced in the EXTENDED project. From its beginning to its final use and categorisation, this table is essential for comprehensively recording and tracking every data collection. The table's columns allude to particular data characteristics: unique reference, owner, participating contributors, creation date, data set source, goal, format, project lifetime application, and secrecy level. Effective data management depends on this methodical and thorough strategy, which helps the project partners and other stakeholders grasp and access important information.

After Table 1 is shown, every field is thoroughly described, highlighting its relevance and use under the EXTENDED project. This breakdown will have particular illustrations showing how different kinds of data are allocated and applied in several projects, tasks, and contexts. This part depends on a thorough knowledge of the framework and goal of every table column, which helps users use the data properly and effectively.

Reference	Title	Data Proprietor	Contributing partner	Creation Date	Dataset Origin	Purpose	Format	Data Application	Confidentiality

Table 1. Data Management Register Tool

1. Reference: Every dataset specifies a particular reference according to its Data Category, WP & Task, Data Sequence, and Sub-data Sequence.

Data Type:

- WP, Task (and any subtask, when applicable): every data type will be linked to a particular WP, task (and subtask if appropriate), from which it comes.

- Data Number: presented sequentially, this indicates the number of datasets of a certain data type generated under a particular WP and specific Task. Variations are indicated just by the Sub-data Number (discussed more

below). All datasets of the same kind inside a separate Task should share the same Data Number.

- Data Sub number: This distinguishes datasets within the same category with the same Data Number from a specific WP and Task. It is identified only after data generation.

Examples of References:

DataType_WP.Task(.Subtask)_DataNumber_DataSubnumber.

- ED_8.1_1_1 (Experimental Data, generated in WP 8, Task 1, from capacity test, pertaining to the cell 1).
- ED_5.2_1_8 (Experimental Data, generated in WP 5, Task 2, from capacity test, pertaining to the cell 8).
- ED_2.2_2_21 (Experimental Data, generated in WP 2, Task 2, from degradation test, pertaining to cell 21).

2. Title: The name given to each IP Data Entry.

3. Data proprietor: The principal bearer of the IP Data Entry. Joint ownership is only allowed when correctly explained in Column 6 (Dataset Origin) and Column 9 (Data Application). Shared ownership IP Data calls for an NDA by the end of the project.

4. Contributing Partner: Everyone who helped create the IP Data Item.

5. Creation Date: The project month when the data is expected to be generated.

6. Dataset Origin: Relates to the Partner(s) providing the WP from which the IP Data Item and/or the data required for it comes.

7. Purpose: Reason for the IP Data item.
8. Format: Physical for DEM goods. Digital entries differ depending on the software used.

9. Data Application: Relevant only during the project's duration. **10. Confidentiality:** CONFIDENTIAL/SENSITIVE (SEN data treated by FAIR data principles)

4.1.2 Data Collection

Data collecting in a project is multi-dimensional and multifarious depending on the kind of data generated, the informational requirements provided by partners for efficient project execution, and the techniques used for accessing, storing, and securing the data. Gathering the pertinent metadata for every dataset specified in Table 1 of the Data Management Register Tool is essential for the EXTENDED project. To guarantee correctness and completeness, this work will be done manually.

Housed centrally in SharePoint, the Data Management Register Tool is easily available to every project participant. This centralised access is crucial for

maintaining consistent and cooperative data management among the different networks of partners. Collected continually during the project, the data offers a dynamic and changing view of its outputs and progress.

This deliverable outlines the approach for gathering data during the EXTENDED project. It covers the data entry methods, the data categorisation standards, and the data register maintenance and update procedures. The focus is on ensuring that the data-collecting approach is thorough, methodical, and in line with the project's goals.

4.2 FAIR DATA

This section describes how the EXTENDED project applies FAIR data principles in accordance with the Guidelines on FAIR Data Management in Horizon 2020 - v3.0 [3]. Adhering to the GO-FAIR project, FAIR—an acronym for Findable, Accessible, Interoperable, and Reusable—embodies the fundamental values described in these rules.

Implementing these ideas mainly intends to increase the worldwide use of sensitive (non-confidential) data. We encourage more efficient and broad use of technical and scientific accomplishments by guaranteeing that data is findable, accessible, interoperable, and reusable. This approach aims to maximise resource use and reduce superfluous economic costs. Adopting the FAIR principles not only fits with best practices in data management but also helps to support the larger scientific community by enabling the sharing and reuse of rich data.

4.2.1 Making Data Findable, including Provisions for Metadata

Comprehensive metadata development, which improves data findability and discoverability, lies at the heart of attaining FAIR data inside EXTENDED. Therefore, the Data Management Register Tool might add further fields throughout the project. The "Reference" field helps one to identify data. The reference aims to guarantee the distinctiveness of every data item.

Already classified into particular areas, such as deliverables and publications, several data types are spread throughout the project's SharePoint. SharePoint will host the data registration tool in a section comparable to those set aside for project deliverables and publications. Project partners can access and consult this dynamic resource for updates.

Moreover, when EXTENDED produces more data, the tool allows for field addition. Data management using this method guarantees scalability and flexibility.

4.2.2 Making Data Openly Accessible

Within the EXTENDED project, all participating entities are encouraged to engage in dissemination efforts using data that is neither sensitive nor confidential. Data intended for public access will be showcased on the EXTENDED website. Despite this, a significant portion of the data utilized in the project is sensitive and will be carefully evaluated for potential public release.

Every participant is required to offer open access to scientific papers linked to their project outcomes as specified in the Grant Agreement on "Open access to scientific publications."

According to the project, all distribution materials must include particular acknowledgments. These consist of a disclaimer exonerating the European Climate, Infrastructure and Environment Executive Agency (CINEA) of responsibility for the document's content, display of the EU emblem, and acknowledgment of funding from the Horizon Europe Green Research and Innovation program (under grant agreement No 101102278).

Finally, the "Dissemination Activities" database on SharePoint will carefully record all dissemination actions during the project. This guarantees a thorough documentation of outreach and communication activities linked to the project.

Apart from non-sensitive data dissemination activities, the EXTENDED project clearly emphasises the management of private data, including meeting presentations, sensitive deliverables, and other secret information. To this end, we maintain a safe data and document repository: our SharePoint. Access rights, folder organisation, and other security policies help manage this system well, guaranteeing that only authorised project members have access to this data. Additionally, project members' contributions and changes regularly keep this repository current, ensuring the safe and quick handling of private data.

4.2.3 Making Data Interoperable

Interoperability in the EXTENDED project depends on the efficient use of metadata. Adopting suitable metadata standards, methods, and naming conventions will help improve interoperability.

The project will use commonly accepted ontologies and a generally relevant language, such as English, to help increase the interdisciplinarity of (meta) data sets.

Knowing that this is a dynamic process, any changes found throughout the project might be included in the DMP as required. This method allows the project's data management techniques to be constantly refined and adapted.

4.2.4 Increase Data Re-Use

Specifically, in Table 1, the Data Management Register Tool methodically assesses each dataset's possible reuse in the framework of the EXTENDED initiative. The dataset's "Confidentiality" classification determines this evaluation:

- Datasets labelled as "Confidential" are considered not suitable for re-use.
- Those marked as "Public" are identified as reusable.

It's crucial to remember that, according to the Consortium Agreement binding all EXTENDED participants, material produced and shared in the project is first deemed confidential. Reflecting the project's cooperative spirit and the scholarly focus of some partners, though, particular datasets meant for distribution will be

produced as reusable. Pinpointing which data produced throughout the project can be reused is greatly aided by the designation under the "Confidentiality" category in the Data Management Register Tool.

4.3 Allocation of Resources

The direct staff expenses comprise activities including data creation and management in the EXTENDED project, corresponding with the person-month distributions for each partner.

SharePoint will be the storage medium for long-term data preservation for up to two years following the project's end. Beyond this time, according to the parameters specified in the Consortium Agreement, all partners will have access to the data via other arrangements.

4.4 Data Security

The EXTENDED project is dedicated to diligently protecting its data, goods, and services from illegal access or use. This requires thorough protective policies.

Data security is mostly the duty of the individual partners. They are in charge of safely storing all operational, processed, and shared data on their site. Authorised project consortium members will have very limited access to this data. In such cases, data transmission between partners should be done using safe methods. This can involve physical data transportation, safe digital transfer techniques, or encrypted data channels. It is strongly advised to adopt SharePoint for such goals.

SharePoint supplies security policies for data kept on the project's web-based repository. Consistent with industry norms, these features have strong defenses against illegal access, including security measures like authentication systems and firewalls [4].

The project data security is under INOVA's control as their servers host the SharePoint data management system. Any questions concerning data security should be directed to INOVA directly for help and explanation, guiding interested parties. Furthermore, as a project organiser, ABEE bears the duty of data protection. ABEE is there to answer questions and offer advice on issues concerning data security.

4.5 Ethical and Legal Aspects

Ethically speaking, the EXTENDED project does not expect any problems from its scientific endeavours.

Legally speaking, Article 4.4 of the EXTENDED Consortium Agreement, agreed upon by all involved organisations, governs the management and sharing of data inside EXTENDED. This requires careful examination of data before distribution or

access provision to guarantee that no confidentiality problems occur according to the communication and distribution strategies developed for each dataset.

It is also vital to understand that EXTENDED's attitude to ethical and legal concerns will change depending on the project's context and breadth.

5. CONCLUSION

Outlined in the deliverable, this first DMP offers a rudimentary approach to controlling data produced in the EXTENDED project. The plan specifies the kinds of data to be gathered, processed, and/or produced, the degree of public access to this data, and the techniques for curation and preservation beyond the project's lifetime.

The paper also follows European Commission (EC) recommendations to help EXTENDED data follow the FAIR principles—ensuring data is Findable, Accessible, Interoperable, and Reusable.

This paper is dynamic and will see regular modifications and improvements, so it is vital to highlight it. Ideas and papers resulting from continuous conversations will be included in this process. Project lifetime projections indicate two upgrades of this DMP in months 18 and 36.

6. REFERENCES

[1] Grant Agreement No. 101102278

[2] EXTENDED Consortium Agreement

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

[4] https://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/ethics_en.htm