



**NEXT GENERATION OF MULTIFUNCTIONAL,
MODULAR AND SCALABLE SOLID STATE
BATTERIES SYSTEM**

D10.6 Quality Management Plan



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Glossary and Abbreviations	
SC	Steering Committee
PC	Project Coordinator
WP	Work Package
WPL	Work Package Leader
CA	Consortium Agreement
DM	Dissemination Manager
EC	European Commission
GA	Grant Agreement
DEC	Dissemination, exploitation and communication

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Executive Summary

The purpose of this Quality Management Plan is to establish a comprehensive framework that focuses on quality control and continuous improvement. Quality Management Plan describes the quality monitoring aspects, proposing specific procedures so that the work execution of the project is adequately monitored. In particular, the Quality Management Plan focuses on project quality management and control, including the quality control of deliverables through peer reviews, monitoring of milestones and progress in compliance with the Grant Agreement and European Commission requirements.

The objectives of the Quality Management Plan are as follows:

Management of Project-Related Documentation: The plan will establish templates for various project-related documentation, such as meeting minutes, deliverables, reports, and other relevant documentation. Standardized templates will ensure consistency, accuracy, and completeness of project documentation, facilitating effective communication and knowledge management.

Quality Control of Project Deliverables: A peer-review process will be implemented to ensure the quality of project deliverables. Peer reviews will involve partners not responsible for the deliverable who will evaluate the deliverables for technical accuracy, adherence to specifications, and overall quality. Feedback and recommendations from peer reviews will be used to improve the deliverables before final submission.

Monitoring of Milestones and Deliverables: The Quality Management Plan will include mechanisms for monitoring project milestones and deliverables. Regular assessments will be conducted to track progress, identify any deviations from the project plan, and take corrective actions when necessary. This will ensure timely completion of deliverables and adherence to project timelines.

Compliance with Grant Agreement and European Commission Requirements: The plan will ensure that the project is implemented in full compliance with the terms and conditions outlined in the Grant Agreement and the specific requirements set by the European Commission. Procedures and processes will be put in place to ensure adherence to relevant regulations, standards, and guidelines.

1. Key Project References

The fundamental binding rules that apply to the EXTENDED project are set out in the following documents, signed by all consortium partners:

- Grant Agreement (and its Annexes);
- Consortium Agreement.

1.1 Grant Agreement

A Grant Agreement (GA) was prepared to be signed between the Project Coordinator (PC) and the European Commission (EC), and by project partners through the Accession Form A. The GA is the legal document through which partners are made legally liable for carrying out the activities described in Annex I of the GA, also called Description of the Action.

The GA includes of the following parts:

- ❖ **Terms and Conditions:** contains specific information like the subject of the agreement, start date, project duration, grant and budget, rights and obligations of the parties, division of beneficiary's roles and responsibilities, among others. *It is strongly recommended that partners read this document carefully.*
- ❖ **Annex 1 (includes Part A and B):** also called Description of the Action, is the main reference document for carrying out the agreed work. It is based on information from Part B of the original proposal, and it is specific for every project. *It is strongly recommended that partners read this document carefully to understand the overall work programme and their specific role in the project.*
- ❖ **Annex 2:** Estimated budget for the action, including some additional information on the estimated budget, namely some specific unit's costs calculations. *For your information.*
- ❖ **Annex 2a:** Additional information on unit costs and contributions (*For your information.*
- ❖ **Annex 3:** Accession Form for Beneficiaries to the Grant Agreement, signed by partners. *For your information.*
- ❖ **Annex 3a** Declaration on joint and several liability of affiliated entities
- ❖ **Annex 4:** Model for Financial Statements. *For your information.*
- ❖ **Annex 5:** Specific rules (if applicable). *Not expected to be used.*

1.2 Consortium Agreement

The Consortium Agreement (CA) is based on the latest version of the DESCA (Development of a Simplified Consortium Agreement) model, which offers a simplified and comprehensive framework stripped of all unnecessary complexity in both content and language. The CA is designed to establish clear rules governing the relationships between partners involved in the project. It covers various aspects such as project management structures, decision-making processes, distribution of the Community financial contribution, rules regarding dissemination, use and access rights, as well as procedures for resolving internal disputes.

The CA is a legally binding document that requires the signature of all project partners. The European Commission is not a contracting partner to the CA. Instead, the legal provisions governing the EC's relations with the project coordinator and

partners are outlined in the Grant Agreement (GA). In case of any conflicts or discrepancies, the regulations stated in the GA take precedence over those in the Consortium Agreement.

Throughout the project, the CA may be subject to amendments or changes by mutual agreement among all partners. These modifications may be necessary to accommodate shifts in the project structure or to introduce additional rules related to the exploitation or protection of generated knowledge, etc. Final decisions regarding the CA are made by the Steering Committee.

The CA for EXTENDED came into effect on June 1, 2023 (the Effective start date) and will remain valid for the entire duration of the GA, spanning from June 1, 2023, to May 31, 2026. It is highly recommended that all partners carefully review this document and adhere to the agreed-upon rules and guidelines.

2. Project-Related Documentation

To ensure consistency, quality, and proper acknowledgment of EU funding, partners involved in the EXTENDED project will utilize provided templates for project documents and presentations. These templates are designed to facilitate the production of project-related materials and maintain a unified image for EXTENDED.

The utilization of templates serves several purposes:

Consistency: by using standardized templates, all project-related documents and presentations will have a cohesive look and feel. This promotes a professional and unified image for EXTENDED, enhancing its brand and communication efforts.

Quality Assurance: The provided templates are designed to meet specific quality standards, ensuring that project materials adhere to established guidelines. The templates serve as a framework for organizing information, formatting content, and presenting data effectively.

Efficient Production: Utilizing templates streamlines the document and presentation creation process for project partners. The predefined structure and layout simplify content creation, enabling partners to focus on the substance of their work rather than spending excessive time on formatting.

EU Funding Acknowledgment: The templates include provisions to prominently display the acknowledgment of EU funding in the requested format. This ensures compliance with contractual obligations and properly attributes the financial support received from the European Union.

The templates for reports and presentations are readily accessible to all partners through the designated TEAMS folder (see the D10.1: The Management Handbook). This centralized location ensures easy access, version control, and collaboration among project participants.

The Management Handbook (D10.1) already submitted (M1), includes internal rules, reporting procedures, communication guidelines, and a set of templates.

The Risk Management Plan (D10.5) will include a report of the risk management process, continuously implemented, describing the mitigations actions planned and conducted, safeguarding smooth run of operations and avoiding negative impacts.

3. Quality Assessment

A rigorous and systematic assessment of general quality will be conducted for the primary results and outcomes of the EXTENDED project. This assessment aims to provide a compact overview of the project's performance by including various metrics, baselines/target values, and their alignment with the work plan. By clearly identifying the responsible beneficiary for each indicator, the assessment ensures transparent verification and facilitates further impact assessment. This approach allows for a thorough evaluation of the project's overall quality and enables stakeholders to track its progress effectively. The inclusion of such a detailed and well-structured assessment framework enhances the project's accountability, transparency, and effectiveness in achieving its objectives.

3.1 Performance Indicators

The Key Performance Indicators (KPIs) set for the project will be diligently monitored by the Project Coordinator (PC) and the Work Package Leaders (WPL) to ensure that the tasks are implemented in the most effective manner to attain the established targets and overall objectives.

Monitoring the quality of the project will be based on the Key Performance Indicators (KPIs) outlined in Table 1 for technical aspects and Table 2 for transversal activities such as dissemination, communication, and engagement. These KPIs are defined in the General Agreement (GA), specifically Annex 1 (DoA) and will be closely monitored to accurately measure the project's outcomes. It is important to highlight that this initial list of KPIs will be enhanced to encompass all pertinent aspects of each Work Package (WP) and the proposed tasks. Project's performance will be evaluated against these KPIs within specific timeframes.

1. Two external reviews will be conducted by the European Commission (EC) at month 18 and month 36. These reviews provide an external assessment of the project's progress and adherence to the defined KPIs.
2. Internal reporting will be conducted every six months. During these intervals, the project team will assess and report on its performance against the KPIs.

EXTENDED's technological/strategic goals will be reached and assessed through the Specific Objectives (SO) and KPIs. Table 1 outlines the KPIs for each SO of the project.

Table 1 –Relation between Specific objectives (SO) and EXTENDED technical Key Performance Indicators (KPIs)

SO	Associated KPIs
SO1: Development of modular battery systems for various application	KPI-1: reduction of the weight by 20%, enabling fast-charging up to 350kW; KPI-2: modular design of the battery for various applications, design of the battery systems according to sustainability approaches.
SO2: Reduced complexity of the battery management system by reducing wire harness through wireless/optical BMS and distributed sensor architecture	KPI-1: reduction of the weight by 20%, enabling fast-charging up to 350kW; KPI-3: Increased cell core temperature estimation accuracy by 50% lower measurement error, enabling a fully automated BMS assembly process and reduction of corresponding time/costs by 30%.
SO3: Increased energy density, thermal safety and simplified manufacture and recyclability of structural components using polymer-based materials	KPI-4: lightweight design: structural weight reduction of 25% against SoA solutions; KPI-5: optimum Thermal Characteristics and Safety: increased safety against fire and possible TP of 40%; KPI-6: manufacturability and Recyclability: reduction of manufacture cost/time of 30% and reduction of recycling cost of 40%.
SO4: Develop and validate a modular and scalable thermal management solution for Solid-State batteries for	KPI-7: efficient and Lightweight Thermal Management System: component elements and weight reduction of 20% against SoA solutions;

SO	Associated KPIs
high cell performance and low cell degradation	KPI-8: Increase cell temperature homogeneity and reduce cell ageing by 50% compared with SoA solutions.
SO5: Testing and qualification of the battery system performance for various applications	KPI-9: Proving the applicability of the developed solid-state battery system to various applications and bringing confidence in the achievement of the project goals.
SO6: Carbon footprint reduction and design optimization of the SSB system for second-life applications and recycling	KPI-10: reduction of at least 25% of the battery life cycle impacts, when compared with current battery systems, achieving a significant increase.
SO7: Define decarbonization strategies for future transport or mobile applications (such as road, waterborne, airborne and rail transport, as well as non-road mobile machinery and industrial applications)	KPI-11: 3 Workshops to bring results to Stakeholders and the general public.

Table 2 –EXTENDED Key Performance Indicators (KPIs) relative to DEC activities

Activity	KPI
Website (visits per month)	200
Social media (% engagement)	More than 30% shared posts
Social media (n° followers)	500(M12), 1000(M24), 1800(M36)
Scientific Publications	5
Non-Scientific Publications	2
Workshops	3
Webinars	2
Roadshow with Key Stakeholders	3 to 5
Participation in other projects / Clusters, especially Battery2030+	5

3.2 Peer-review of project deliverables

Deliverables serve as the tangible outcomes of the project, providing evidence of its performance and enabling the Commission to monitor its progress, implementation, and impact. The specific deliverables for each WP are identified in Annex 1 of the General Agreement (GA) and must be submitted according to the specified timetable.

The EXTENDED project adopts a participatory and iterative approach to ensure active involvement from all project partners in the development and production of deliverables. It is important to note that the responsibility for the content of each deliverable report rests with the author(s). This approach serves as an internal quality review process, ensuring that the reports developed possess technical value, accuracy, and relevance.

The following process is proposed for the development and review of deliverables:

1. **Monitoring and Progress:** draft deliverables, if relevant, can be shared with all consortium members, allowing them at least one week to provide feedback.
2. **Quality Review:** The WP leader is responsible for ensuring that the responsible partner is ready to share the final draft of the deliverable with the Steering Committee and with the assigned reviewers **at least two**

weeks before the due date (refer to the deliverable list in Table 3). At least one partner per deliverable is responsible for its quality review process as indicated in table 3.

3. **Feedback:** reviewer members should provide their final comments to the responsible partner **within one week**. If the deliverable has more than one partner indicated for the quality review process, reviewers should work collaboratively on the deliverable, previously added by the responsible partner to the designated project shared folder.
4. **Submission:** The partner responsible for the deliverable must then send the very final version to the Project Coordinator (PC) and Project Management Office (PMO) **at least 3 working days before the due date**.
5. **Decision Making:** The PC makes the final decision on the deliverables, and the **PMO is responsible for uploading the deliverable** onto the Funding & Tenders Portal **at the latest on the due date** and informs the EC.

Table 3 – EXTENDED Deliverables List and quality review partners assignment

No	Deliverable name	Responsible partner	Delivery date	Reviewer Partner	Reviewer Partner
D1.1	Report on use-cases and metrics	SIRO	31 Aug 2023	BOZ	SOL
D1.2	Report on the requirements and specifications for the different use cases	SIRO	31 Mar 2024	AKS	FM
D1.3	Report on the final interfaces	ABEE	31 Mar 2024	FHG	THI
D1.4	Literature survey papers for SSB and subsystem	AKS	31 Mar 2024	TC	SIRO
D2.1	Simulation platform specifications and architecture design guidelines	ABEE	31 May 2024	FM	BMZ
D2.2	Report on Design-for-eXcellence	INEGI	31 May 2024	SIRO	ABEE
D3.1	Definition of battery management system safety requirements and architecture	Fraunhofer	31 Jul 2024	LUM	THI
D3.2	Advanced sensors and actors for solid-state battery systems	LUM	30 Nov 2025	FHG	ABEE
D3.3	Modular battery management system prototype	Fraunhofer	30 Nov 2025	CEA	LUM
D4.1	Thermal characterization of the components of the battery system	ABEE	31 Jan 2024	IKL	UPV
D4.2	Preliminary thermal design of the bTMS	IKL	31 Jan 2025	FM	UPV
D4.3	Safety solution for the battery module and pack	UPV	31 Mar 2025	THI	CEA
D4.4	Final thermal design of the bTMS	ESP-MU	31 May 2025	IKL	FM
D5.1	Preliminary report of mechanical design solutions	BMZ	29 Feb 2024	IKL	ABEE
D5.2	Final report of mechanical solutions	IKL	30 Nov 2024	BMZ	CEA
D5.3	Mechanical Solution Prototype Manufacture	BMZ	31 May 2025	IKL	FHG
D6.1	Report on safety evaluation of the battery cells	THI	31 Jan 2024	FHG	BMZ
D6.2	Report on the virtual safety assessment of the battery system	ESP-MU	31 May 2025	ABEE	THI
D6.3	Report on safety guidelines and recommendation	THI	30 Nov 2025	FM	FHG
D7.1	Report on test plans and scenarios	FM	31 Jul 2025	INEGI	FM
D7.2	Battery module assembly and prototyping	CEA	30 Nov 2025	INEGI	FHG

No	Deliverable name	Responsible partner	Delivery date	Reviewer Partner	Reviewer Partner
D7.3	Module performance testing and validation	FM	31 May 2026	AKS	INEGI
D7.4	Module Aging Tests	AKS	31 May 2026	FHG	FM
D8.1	Report on Life Cycle Sustainability Assessment of EXTENDED SSB	INEGI	31 Jan 2026	ABEE	AKS
D8.2	Roadmap towards higher SSB technological uptake	BMZ	31 May 2026	INEGI	AKS
D8.3	Report on networking activities and Roadmap to higher TRLs	TC	31 May 2026	ABEE	THI
D9.1	Communication and Dissemination Plan	INOVA+	30 Nov 2023	ABEE	TC
D9.2	Communication and Dissemination Plan	INOVA+	30 Nov 2024	ABEE	TC
D9.3	Communication and Dissemination Plan	INOVA+	31 May 2026	ABEE	TC
D9.4	Initial Business models and exploitation plan	TC	30 Nov 2023	INOVA+	ABEE
D9.5	Final Business models and exploitation plan	TC	31 May 2026	INOVA+	ABEE
D9.6	Preliminary IPR management plan	INOVA+	30 Sep 2024	ABEE	TC
D9.7	Final IPR management plan	INOVA+	31 May 2026	ABEE	TC
D10.1	Management Handbook	INOVA+	30 Jun 2023	ABEE	
D10.2	Data Management Plan	ABEE	30 Nov 2023	INOVA+	TC
D10.3	Data Management Plan	ABEE	30 Nov 2024	INOVA+	TC
D10.4	Data Management Plan (final)	ABEE	31 May 2026	INOVA+	TC
D10.5	Risk Management Plan	INOVA+	31 May 2024	INOVA+	TC
D10.6	Quality Management Plan	INOVA+	31 Jul 2023	ABEE	

3.3 Monitoring of Milestones

Effective monitoring of milestones is crucial for ensuring the timely progress and successful completion of the EXTENDED project. This section outlines the approach and processes for monitoring milestones throughout the project lifecycle. The objective of milestone monitoring is to track the achievement of key project milestones and assess their alignment with the project plan.

A milestone tracking system will be implemented to record, monitor, and report on the progress of each milestone. Milestones described in the project will be followed using MsTeams planner software. The WPL are responsible for providing updates on progress, and highlighting any challenges or issues encountered. These updates are captured, documented, and shared with relevant stakeholders.

Table 4 – List of EXTENDED Milestones

Milestone No	Milestone name	WP	Due date	Means of verification
MS1	Report about use case, safety, and security requirements	1	M03, M10	D1.1 delivered and accepted by internal reviewers
MS2.1	A final modular battery system concept for the different use cases	2	M12	The final battery system design is fixed, and this is through the delivery of D2.1
MS2.2	Final requirements regarding the component level	2	M12	The final components requirements based on D2.1 are defined and transferred to WP3, WP4, WP5
MS3.1	BMS architecture defined	3	M14	The BMS architecture has been fixed and the corresponding requirements are defined
MS3.2	First internal BMS prototype available	3	M30	The first BMS prototype has been delivered and validated
MS4	Final thermal design PDR of the bTMS	4	M24	The thermal management design is fixed and defined through the delivery of D4.1
MS5.1	Review and selection of final design concepts	5	M09	Based on D5.1, concepts for the final design phase will be selected.
MS5.2	Final Design of mechanical solutions	5	M18	The final mechanical design is completed and presented in D5.2
MS5.3	Prototype manufacture	5	M24	Prototypes have been prototyped and ready for testing and validation
MS7.1	Battery modules ready for testing	7	M30	Battery modules have been received by the testing partners
MS8.1	Sustainability assessment	8	M36	D8.1 delivered and accepted by internal reviewers
MS9.1	Website delivered and published	9	M03	Website online

3.4 Publications

Public events: to maintain coherence, integrity, and the highest standard of information during public events, it is imperative that speakers and responsible partners of publications share the Abstract and general guidelines of the material with all project partners at least 45 days prior to the event. For all events, it is mandatory to use EXTENDED communication tools created to support both external and internal communication.

Scientific publications: the Information Manager (IM) will assume the responsibility of conducting a meticulous review of scientific publications, ensuring their scientific relevance and accuracy.

Acknowledgements: all project publications must explicitly acknowledge the funding received from the EXTENDED project, specifically identifying the European Commission and the corresponding Grant Agreement (No 101102278). This requirement serves to promote transparency and provide proper attribution to the funding source.

4. Conclusion

In conclusion, the EXTENDED Quality Management Plan underscores consortium commitment to maintaining the highest standards in project execution. Through the utilization of provided templates for project-related documentation, consistency, quality, and proper acknowledgment of EU funding will be ensured, fostering a unified image for EXTENDED. The rigorous quality assessment framework established within the plan ensures a comprehensive overview of project performance, aligning metrics with the work plan, and enhancing transparency. The right balanced allocation of partners for developing the deliverables review, according to their involvement and expertise, will ensure to meet the high-quality standards defined for EXTENDED. Moreover, in compliance with the Project Grant Agreement requirements and European Commission expectations, the effective time planning of internal and external reporting, deliverables review, and publications-related information, will also support project quality management and control.

In summary, the Quality Management Plan serves as an essential roadmap for ensuring the highest standards of quality throughout the duration of the EXTENDED project. The strategies outlined aim to manage project-related documentation effectively, ensure the utmost quality of project deliverables through rigorous peer reviews, and provide robust mechanisms for monitoring project performance, milestones and deliverables. Additionally, the plan underscores the importance of compliance with the Grant Agreement and European Commission requirements, which is fundamental to the project's success.

This comprehensive framework not only fulfills the immediate needs of the project but also sets a precedent for future endeavors in the realm of multifunctional, modular, and scalable solid-state battery systems. By adhering to the guidelines and procedures detailed in this plan, the project team is well-equipped to achieve its objectives and contribute meaningfully to advancements in this crucial field.