Swappable Container Waterborne Transport Battery

Call Identifier: H2020-LC-BAT-2020

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Reducing the Cost of Large Batteries for Waterborne Transport

D10.3

Project Management Plan V1

March 7, 2025

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TABLE OF CONTENTS

GLOSSARY OF TERMS

Term	Definition
AB	Advisory Board
CD	Current Direct
EaaS	Energy as a Service
EC	European Commission
EEAB	External Expert Advisory Board
EMC	Electromagnetic Compatibility
EU	European Union
GA	General Assembly
PC	Project Coordinator
PMP	Project Management Plan
PSC	Project Steering Committee
RAID	Risks, Actions, Issues, Decisions
RP	Reporting Period
TL	Task Lead
TPM	Technical Project Manager
WP	Work Package
WPL	Work Package Lead

DOCUMENT PROPERTIES

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	☐CO, Confidential, only for members of the consortium (including the Commission Services)
	☐EU-RES, Restricted, Classified Information
	☐EU-CON, Confidential, Classified Information
	☐EU-SEC, Secret, Classified Information

REVISION HISTORY

Version	Issue Date	Changes Made / Reason for Issue
0.1	18-Feb-25	Initial Version
1.0	7-Mar-25	Final Version

"This document reflects only the author's view and the Agency is not responsible for any use that may be made of the information it contains".

PROJECT SUMMARY

The transport sector contributes to almost a quarter of Europe's greenhouse gas (GHG) emissions. Compared to other sectors, such as agriculture or energy industries, it is the only sector with emissions higher than that of 1990. Waterborne transport emissions represent around 13% of the overall EU greenhouse gas emissions from the transport sector. Moreover, waterborne transport emissions could increase between 50% and 250% by 2050 under a business as-usual scenario, undermining the objectives of the Paris agreement. The challenge for a large-scale adoption and implementation of batteries for waterborne transport is mainly related to the high costs of the battery systems and cells.

The Current Direct project addresses these challenges by proposing an innovative lithium-ion cell optimized for waterborne transport, using novel manufacturing techniques allowing for a consistent cost reduction compared to the current market prices. Additionally, a swappable containerized energy storage system optimized for cost and operation in the waterborne transport industry will be developed.

The overarching aim of the Current Direct project is to develop and demonstrate an innovative interchangeable waterborne transport battery system and EaaS Platform in an operational environment at the Port of Amsterdam at TRL7 that facilitates fast charging of vessels, fleet optimization and novel business models. The Current Direct project is dedicated to (i) significantly reduce the total cost of waterborne transport batteries, (ii) cut GHG emissions of the marine transport sector through electrification of vessel fleets, (iii) increase the energy density of waterborne battery cells and (iv) trigger investments for innovation, job and knowledge creation in the European marine transport and battery sector.

The Current Direct EcoSystem is shown in **Error! Reference source not found.**

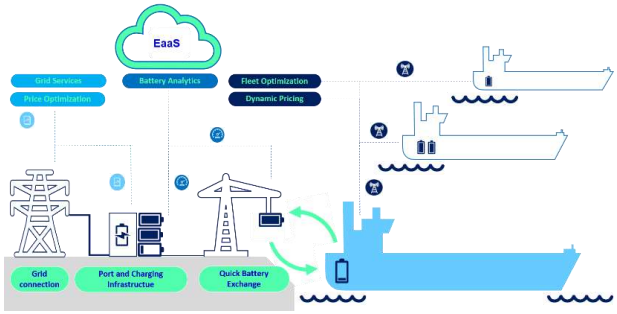

Figure 1. Current Direct EcoSystem

EXECUTIVE SUMMARY

The project management plan contains all the relevant information and rules in order to successfully execute the project. It explains how to document the project, how the management and procedures are organised. For Current Direct, the project management plan contains (or references) the project plans and the major project management processes, rules and guidelines to follow in the project. It is a living document and is updated as part of project management.

The project management plan is intended to be a reference for the project participants and facilitates project management by providing structured processes that can be followed.

The first version was updated with an executive summary, the project summary has been updated, task titles have been adjusted, Figures 12, 14, 15, 16 have been enlarged, conclusions added.

The related tasks are

1. Definition of Management and Quality Assurance Procedures
2. Communication With the Commission
3. Innovation, Risk and Technical Project Management
4. Administrative and Financial Management

All these tasks are ongoing. The first project management plan included the production of a project management handbook which is again subject to some changes during the project. The handbook, templates needed, and the excel sheets for follow up of risk management, financial management,… are accessible on the common platform which was BOX in the first period and is replaced by Sharepoint after the restart of the project.

1. SPECIFIC OBJECTIVES OF WORK PACKAGE 10

The main objective of WP10 is to ensure the continuous monitoring and implementation of the project's actions and the successful achievement of Current Direct's objectives.

Specific Objectives:

- Ensure effective organization and day-to-day management and implementation of the project
- Ensure on-time delivery of progress reports and deliverables (CA, technical and financial reports)
- Establish effective communication with the commission
- Ensure proper interaction between collaborating partners and set up project meetings
- Establish and monitor a risk register, approve any change, and implement H&S protocols if necessary

1.1. T10.1 Definition of Management and Quality Assurance Procedures

This task will establish the Management and Quality Assurance Procedures to ensure proper implementation and quality performance of the project. The Project Management Plan (PMP) defines a series of procedures and guidelines aligned with the H2020 requirements that encompass procedures for managing quality, data, project risks, financial management and engagement, gender issues, presentation standards for deliverables, and reports to the EC and quality assurance measures.

The PMP will be under continuous monitoring and updates will be made to reflect the status of the project. Two further updated Deliverable versions will be sent to the European Commission in month 50 (D10.3) V2 and month 66 (D10.4) v3.

2. PROJECT METHODOLOGY

2.1. Overall Work Plan

The Current Direct work plan is designed to efficiently implement the project's objectives. The project is organized as ten work packages over 66 months. The work plan is fully aligned with the project's goals and milestones and has been carefully designed to ensure the project's technical feasibility within defined tasks, assigning responsibilities according to each involved partner's core expertise. Each work package (WP) is characterized by well-defined objectives and measurable outcomes.

The objectives will be achieved by implementing the work according to the following phases:

1. **Phase I**: Assessment & Requirements
2. **Phase II:** Development
3. **Phase III:** Integration & Demonstration
4. **Phase IV:** Standardization
5. **Phase V:** Uptake & Exploitation

Figure 2 shows represents the overall approach and methodology of Current Direct:

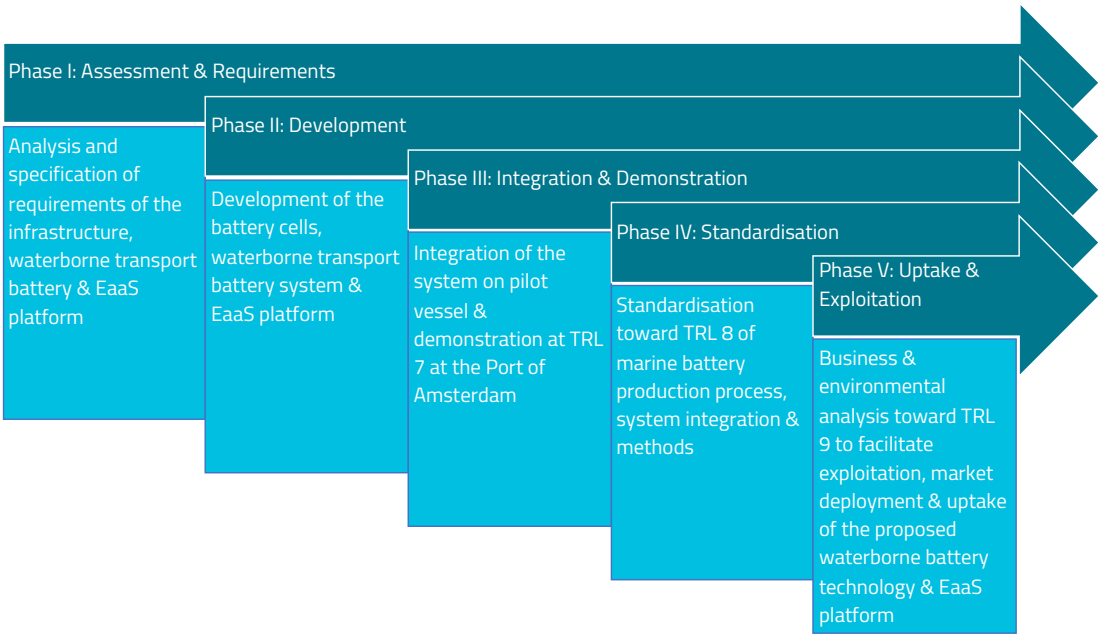

Figure 2 Work Plan Methodology

2.2. Work Package Structure

The Current Direct project consist of 10 work packages with 44 separate tasks led by partners from 12 partnering institutions across Europe. The work package structure is the means through which the concepts and objectives presented in the project proposal will be realized, through the execution of a tangible work packages broken down into the different tasks, deliverables, and milestones. The Work Package Structure also represents the contractual obligations of the project partners.

The comprehensive list of Work Packages, Tasks and leading partners is provided below in Table 1, along with the Start and End Month dates.

WP / Task Number	WP Title	Lead Partner	Start Month	End Month
WP1	**Ethics Requirements**	**VUB**	**1**	**66**
T1.1	Verify Compliance with Ethics Requirements	VUB	1	66
WP2	**Specifications And Requirements**	**Foreship**	**1**	**48**
T2.1	Analysis And Specification of The Waterborne Battery	LCH	1	48
T2.2	Analysis And Specification of The Energy-As-A-Service Platform	LCH	1	48
T2.3	Analysis Of the Waterborne Transport Market to establish standardized Interfaces and Topology requirements	Foreship	1	48
T2.4	Analysis And Specification of The Infrastructure Requirements	Wartsila	1	48
T2.5	Analysis And Specification of Recyclability	Umicore	1	48
WP3	**Development Of Waterborne Transport Battery Cell**	**UHASSELT**	**2**	**56**
T3.1	Development Of Optimized and Validated Battery Cells	LCD	3	51
T3.2	Cell Cathode Modelling and Optimization for Waterborne Transport	Umicore	2	51
T3.3	Development Of Physics Based Cell Model	U Hasselt	6	56
WP4	**Development Of the Waterborne Transport Battery System**	**Leclanché**	**1**	**57**
T4.1	Development Of Optimized and Validated Battery Pack	Leclanché	4	57
T4.2	Development Of BMS Ultrasound Sensors	Spear	1	57
T4.3	Development Of BMS Smart Cell Supervisor	Vito	1	57

WP / Task Number	WP Title	Lead Partner	Start Month	End Month
T4.4	Development Of Composite Structural & Thermal Material	VUB	1	51
T4.5	Development Of Optimized and Validated Battery Container System	Wartsila	7	57
WP5	**Development Of the Energy-As-A-Service (Eaas) Platform**	**Rhoé**	**4**	**57**
T5.1	Development Of Data Management System and Database Structure	Aviloo	4	57
T5.2	Development Of Battery Analytics Software	Aviloo	4	57
T5.3	Development Of Dynamic Payment Engine	Rhoé	10	57
T5.4	Development Of Fleet Optimization and Monitoring Platform	Rhoé	7	57
T5.5	Development Of Platform APIs and User Interfaces	Rhoé	13	57
WP6	**System Integration and Demonstration Of the Waterborne Transport Battery System and Eaas Platform**	**Wartsila**	**4**	**66**
T6.1	Operational Test Planning and Certification Methodology	Lloyd's	4	60
T6.2	System Integration of The Supporting Vessel and Shoreside Infrastructure	Wartsila	4	60
T6.3	Integration And Testing of System Components	Leclanché	20	60
T6.4	Deployment Of the Waterborne Transport Battery and Supporting Infrastructure	Wartsila	22	60
T6.5	System Demonstration Operation	Kotug	25	66
T6.6	Evaluation And Validation of The Demonstration Activities	EDP	28	66
WP7	**Standardization For Scale**	**LR**	**3**	**60**
T7.1	Development Of Standardized Interfaces	Foreship	4	47
T7.2	Development Of Standardized Communication Protocols	Wartsila	4	47
T7.3	Standardization And Certification Plans for Marine Battery Systems	Lloyd's	3	56
T7.4	Risk Based HSE Assessment	Lloyd's	10	57

WP / Task Number	WP Title	Lead Partner	Start Month	End Month
T7.5	Waterborne Cell and Battery Production Process Efficiency Plan	Leclanché	10	60
T7.1	Development Of Standardized Interfaces	Foreship	4	60
WP8	**Economic Evaluation, Business Model And Roadmap For Commercialization**	**EDP CNET**	**1**	**66**
T8.1	Life Cycle Cost and Environmental Impact Assessment	Foreship	16	66
T8.2	Economic Valuation and Cost-Benefit-Analysis of The Eaas Concept	Foreship	22	66
T8.3	Validation Of Business Cases, Development of Business and Financial Models	Leclanché	4	64
T8.4	Inland Waterway Route Infrastructure Study	Rhoé	4	47
T8.5	Marine Transport Market Impact and Roadmap for Commercialization	EDP	28	64
T8.6	Exploitation Plan and IPR management	EDP	1	48
WP9	**Outreach Activities - Communication And Dissemination Actions**	**EDP CNET**	**2**	**66**
T9.1	Replication Plan/ Scale up of Current Direct concept	EDP	31	66
T9.2	Dissemination And Communication Plan	EDP	2	4
T9.3	Stakeholder Engagement Through Webinars, Workshops, Events and A Final Conference	Foreship	3	66
T9.4	Engage Other European Research and Innovation Projects through conferences, workshops, meetings	Leclanché	3	66
WP10	**Project Management**	**VUB**	**1**	**66**
T10.1	Definition of Management and Quality Assurance Procedures	VUB	1	3
T10.2	Communication With the Commission	VUB	1	66
T10.3	Innovation, Risk And Technical Project Management	EDP	1	66
T10.4	Administrative and Financial Management	VUB	1	66

Table 1 List of WP and Tasks

2.3. Milestones

The Current Direct project has defined 11 major Milestones that will be achieved during the project, as listed in Table 2. Each Milestone represents control checkpoints in the project that help to chart progress. Milestones will be used to identify that several tasks or key deliverables have been completed, allowing the project to progress to the next phase. Each Milestone is provided with a "means of verification", which provides the demonstratable evidence that the Milestone has been reached and achieved. This is typically through the submission of a Deliverable but may also take the form of a completed activity e.g., conference or event.

WBS	Milestone	Lead Partner	Related WP	Due Date	Status	Means of Verification
MS1	WP2 Requirements	Foreship	WP2	M48	Achieved	1. Requirements for Waterborne Battery Container 2. EaaS Platform, and Supporting Shore and Vessel Infrastructure Defined
MS2	Cell Prototypes	Leclanché	WP3	M51	Pending	1. Cell Prototypes completed
MS3	Battery Design Review	Leclanché	WP4	M53	Pending	1. Key design decisions frozen for battery pack verification testing 2. Selection of composite structure for verification testing 3. BMS ultrasound sensor concept testing results evaluated 4. EMC test results of Smart Cell Supervisor evaluated
MS4	Battery Prototypes	Leclanché	WP4	M53	Pending	1. Battery prototypes completed
MS5	Eaas Platform	Rhoé	WP5	M47	Achieved	1. EaaS platform code released
MS6	System Testing	Wärtsilä	WP6	M60	Pending	1. System integrating testing complete
MS7	Demonstration	Wärtsilä	WP6	M66	Pending	1. Demonstration and validation complete
MS8	Draft Certification Standards	Lloyd's	WP7	M60	Pending	1. Draft standards for interfaces, testing and certification published

WBS	Milestone	Lead Partner	Related WP	Due Date	Status	Means of Verification
MS9	Conclusion	VUB	WP10	M66	Pending	1. Final report and outreach activities concluded
MS10	Conference	EDP	WP9	M66	Pending	1. Conference for all value chain stakeholders (suppliers, ship operators, utilities, ports, governmental agencies) reviewing demonstration results and launching commercial offering.
MS11	Infrastructure Study	Rhoé	WP8	M47	Achieved	1. Report on inland waterway traffic and charging infrastructure recommendations released.

Table 2 Project Milestones

2.4. Deliverables

The Current Direct project has defined 31 formal deliverables that will be achieved during the project, as listed in Table 3. Deliverables are distinct, tangible, or intangible outcomes of the project produced in accordance with the project schedule. Deliverables will be developed by the project partners and represent the culmination of project partner effort and activity. Several deliverable due dates are aligned with the project major Milestones as "means of verification", whilst others exist as standalone submissions. Each deliverable will be submitted to the Current Direct project EC Funding and Tenders Portal as an essential part of the continuous reporting and monitoring activity.

No.	WBS	Title	Related WP	Lead Partner	Type	Status	Dissemination	Due Date
D1	**D1.1**	NEC - Requirement No. 1	WP1	VUB	Ethics	Submitted	Confidential	M3
D2	**D1.2**	H - Requirement No. 2	WP1	VUB	Ethics	Submitted	Confidential	M3
D3	**D1.3**	POPD - Requirement	WP1	VUB	Ethics	Submitted	Confidential	M3
D4	**D2.1**	Design Recommendations Battery	WP2	Leclanché	Report	Submitted	Public	M48
D5	**D2.2**	Design Recommendations for the EaaS	WP2	Leclanché	Report	Approved	Public	M3
D6	**D2.3**	Recommendations Ship & Shore Interfaces	WP2	Foreship	Report	Approved	Public	M3
D7	**D3.1**	Cell Prototype Test	WP3	Leclanché	Demonstrator	Pending	Public	M51
D8	**D3.2**	Cell Design Modelling	WP3	Umicore	Report	Pending	Public	M51
D9	**D3.3**	Cell Aging Model Verification	WP3	U Hasselt	Report	Pending	Public	M56
D10	**D4.1**	Battery Test	WP4	Leclanché	Demonstrator	Pending	Public	M57
D11	**D4.2**	Smart Cell EMC Compatibility	WP4	Vito	Report	Submitted	Public	M6
D12	**D4.3**	Composite Structure	WP4	VUB	Report	Pending	Public	M51
D13	**D5.1**	Database & Analytics Code	WP5	Aviloo	Other	Pending	Confidential	M57
D14	**D5.2**	EaaS Code	WP5	Rhoé	Other	Submitted	Confidential	M47

No.	WBS	Title	Related WP	Lead Partner	Type	Status	Dissemination	Due Date
D15	**D6.1**	Battery & Power Integration Test	WP6	Wärtsilä	Demonstrator	Pending	Public	M60
D16	**D6.2**	Demonstration System	WP6	Kotug	Demonstrator	Pending	Public	M66
D17	**D7.1**	Standards for Power & Communication	WP7	Wärtsilä	Report	Submitted	Public	M47
D18	**D7.2**	Class & Flag Rule Recommendations	WP7	Lloyd's	Report	Pending	Public	M60
D19	**D7.3**	Production Efficiency Analysis	WP7	Leclanché	Report	Pending	Public	M56
D20	**D7.4**	Risk Assessment Report	WP7	LR	Report	Pending	Public	M57
D21	**D8.1**	Cost-Benefit & Environmental Impact	WP8	Foreship	Report	Pending	Public	M66
D22	**D8.2**	Business Plan	WP8	Rhoé	Report	Pending	Confidential	M64
D23	**D8.3**	Route Infrastructure Study	WP8	Rhoé	Report	Submitted	Public	M47
D24	**D8.4**	Exploitation Plan	WP8	EDP CNET	Report	Submitted	Public	M48
D25	**D9.1**	Replication Plan & Final Exploitation Plan	WP9	EDP	Report	Pending	Public	M66
D26	**D9.2**	Dissemination and Communication Plan	WP9	EDP	Report	Approved	Public	M4
D27	**D10.1**	Project Management Plan V1	WP10	Rhoé, VUB	Report	Submitted	Public	M2
D28	**D10.2**	Data Management Plan	WP10	Rhoe, VUB	ORDP	Submitted	Public	M6
D29	**D10.3**	Project Management Plan V2	WP10	Rhoé, VUB	Report	Pending	Public	M50
D30	**D10.4**	Project Management Plan Final	WP10	Rhoé, VUB	Report	Pending	Public	M66
D31	**D10.5**	Cumulative expenditure report	WP10	Rhoé, VUB	Report	Submitted	Public	M48

Table 3 Project Deliverables

All deliverables will be categorised by Type and Dissemination Level according to the European Commission Dissemination and Communication guidance, Table 4.

Type Code	Type Description	Dissemination Code	Dissemination Type
R	Document, Report	PU	Public
DEM	Demonstrator, pilot, prototype	CO	Confidential, only for members of the consortium
DEC	Websites, patent fillings, videos, etc.	EU-RES	Restricted, Classified Information
OTHER	Other types	EU-CON	Confidential, Classified Information
ETHICS	Ethics requirement	EU-SEC	Secret, Classified Information
ORDP	Open Research Data Pilot		
DATA	data sets, microdata, etc		

Table 4 Deliverables Type and Code

All deliverables will use the Current Direct project template that provides a common presentation and organisation of the Deliverable content. All deliverables will be submitted in English

2.5. Schedule

The Current Direct project schedule provides a visual representation of the milestones, work package structure, tasks, and durations as a Gantt chart. The project schedule involves the calculation of duration and resources required; it defines the logic and sequence and the determination of the critical path, float and start and finish dates for the individual activities.

The project schedule will be used to focus project partner attention on the most important issues and activities to ensure the success of the project in achieving the concept and objectives.

Figure 3 presents the strategic schedule of Current Direct at a high-level to provide an overall pictorial representation of the plan.

Work packages and Tasks		Lead	Month Start	Month End
Current Direct Project		Rhoé	1	66
WP1	**Ethics Requirements**	**VUB**	**1**	**66**
T1.1	Verify Compliance with Ethics Requirements	VUB	1	66
WP2	**Specifications and Requirements**	**Foreship**	**1**	**48**
T2.1	Analysis and Specification of the Waterbone Battery	Leclanché	1	48
T2.2	Analysis and Specification of the Energy-as-a-Service Platform	Leclanché	1	13
T2.3	Analysis of the Waterborne Transport Market Interfaces and Topology Requirements	Foreship	1	13
T2.4	Analysis and Specification of the Infrastructure Requirements	Foreship	1	16
T2.5	Analysis and Specification of Recycability	Umicore	1	13
WP3	**Development of the Waterborne Transport Battery Cell**	**U Hasselt**	**2**	**56**
T3.1	Development of Optimized and Validated Battery Cell	Leclanché	3	51
T3.2	Cell Cathode Modeling and Optimizaqtion for Waterborne Transport	Umicore	2	51
T3.3	Development of Physics Based Cell Model	U Hasselt	6	56
WP4	**Development of the Waterborne Transport Battery System**	**Leclanché**	**1**	**57**
T4.1	Development of Optimized and Validated Battery Pack	Leclanché	4	57
T4.2	Development of BMS Ultrasound Sensors	Leclanché	1	57
T4.3	Development of BMS Smart Cell Supervisor	Vito	1	46
T4.4	Development of Composite Structural & Thermal Material	VUB	1	57
T4.5	Development of Optimized and Validated Battery Container System	Wartsila	7	57
WP5	**Development of the Energy-as-a-Service (EaaS) Platform**	**Rhoé**	**4**	**57**
T5.1	Development of Data Management System and Database Structure	Aviloo	4	57
T5.2	Development of Battery Analytics Software	Aviloo	4	57
T5.3	Development of Dynamic Payment Engine	Rhoé	10	47
T5.4	Development of Fleet Optimization and Monitoring Platform	Rhoé	7	47
T5.5	Development of Platform APIs and User Interfaces	Rhoé	13	47
WP6	**System Integration and Demonstration of Waterborne Battery and EaaS platform**	**Wartsila**	**4**	**66**
T6.1	Operational Test Planning and Certification Methodology	Lloyd's	4	50
T6.2	System Integration of the Supporting Vessel and Shoreside Infrastructure	Wartsila	4	60
T6.3	Integration and Testing of System Components	Leclanché	19	58
T6.4	Deployment of the Waterborne Transport Battery and Supporting Infrustructure	Wartsila	22	60
T6.5	System Demonstration Operation	Kotug	25	66
T6.6	Evaluation and Validation of the Demonstration Activities	EDP	25	66
WP7	**Standardization for Scale**	**Lloyd's**	**3**	**60**
T7.1	Development of Standardized Interfaces	Foreship	4	47
T7.2	Development of Standardized Communication Protocols	Wartsila	4	47
T7.3	Standardization and Certification Plans for Marine Battery Systems	Lloyd's	3	60
T7.4	Risk based HSE Assessment	Lloyd's	10	57
T7.5	Waterborne cell and battery production process efficiency plan	Leclanché	10	56
WP8	**Economic Evaluation, Business Model and Roadmap for Commercialisation**	**EDP**	**1**	**66**
T8.1	Life Cycle Cost and Environmental Impact Assessment	Foreship	16	66
T8.2	Economic Valuation and Cost-Benefit-Analysis of the EaaS Concept	Foreship	22	66
T8.3	Validation of Business Cases, development of Business and Financial Models	Rhoé	4	64
T8.4	Inland Waterway Route Infrastructure Study	Rhoé	4	47
T8.5	Marine Transport Market Impact and Roadmap for Commercialization	EDP	28	65
T8.6	Exploitation Plan and IPR Management	EDP	1	66
WP9	**Outreach activities - Communication and Dissemination Actions**	**EDP**	**2**	**66**
T9.1	Replication Plan / Scale-up of Current Direct Concept	EDP	31	66
T9.2	Dissemination and Communication Plan	EDP	2	66
T9.3	Stakeholder Engagement Through Webinars, Workshops, Events and a Final Conference	Rhoé	2	66
T9.4	Engage other European Research and Innovation Projects through conferences, workshop, meetings	Rhoé	2	66
WP10	**Project Management**	**VUB**	**1**	**66**
T10.1	Definition of Management and Quality Assurance Procedures	VUB	1	3
T10.2	Communication with the Commission	VUB	1	66
T10.3	Inovation, Risk and Technical Project Management	EDP	1	66
T10.4	Administrative and Financial Management	VUB	1	66

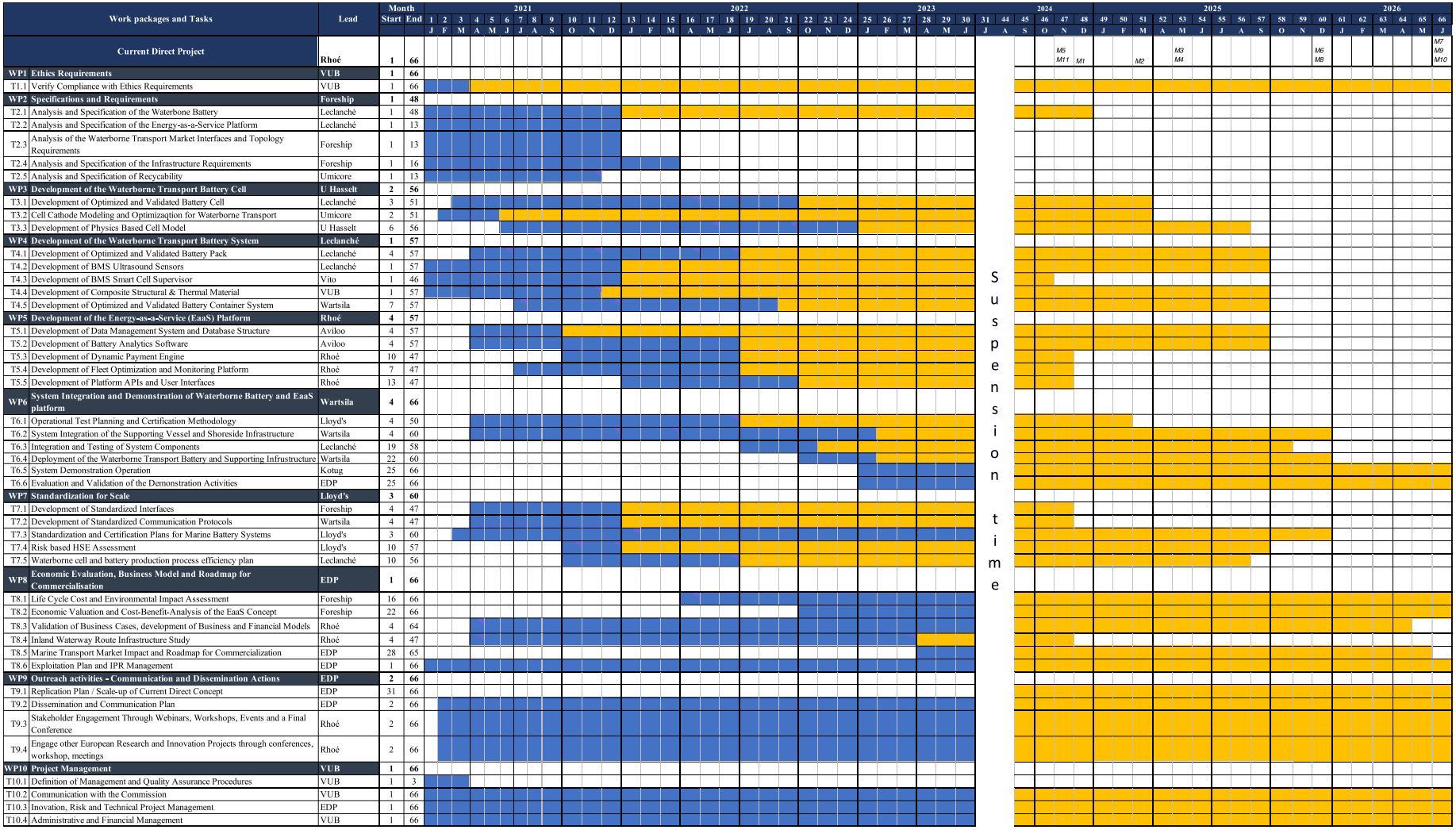

Figure 3 Project Schedule

The project schedule will be reviewed continuously during the PSC monthly meetings and adjusted accordingly to reflect the actual status of the project development.

Wherever necessary the project schedule will be adjusted if risks and issues affect the ability of the project tasks to be completed as originally foreseen in the Grant Agreement. Any issues that could delay the project Milestones and Deliverables will be notified to the Project Officer for resolution.

3. PROJECT GOVERNANCE, ORGANISATION, AND ROLES

3.1. Governance

Considering the characteristics of the Current Direct project and the complexity of the activities foreseen, extreme attention has been paid to define the most appropriate governance and management structure for the project. All the information concerning the structure and responsibilities is accurately defined in the Consortium Agreement, together with all the decision-making mechanisms and measures of each of the individual bodies.

The Current Direct consortium has been carefully selected to develop and demonstrate the innovative technologies and business models necessary to overcome the identified barriers of waterborne transport batteries in the market. The diverse consortium is coordinated by VUB and incorporates 12 experienced and skilled organizations to join their complementary abilities and ambition to facilitate the development of the marine energy sector of Europe. This team is composed of highly skilled, experienced, and ambitious partners who will work together to match the project objectives and deliver the impacts described in this proposal. The proposal brings partners from eight different EU countries (Germany, Portugal, Greece, Belgium, Austria, Netherlands, Finland) as well as from Norway and the UK, alongside collaboration with experts in the Switzerland.

Figure 4 shows the geographic spread of the consortium members.

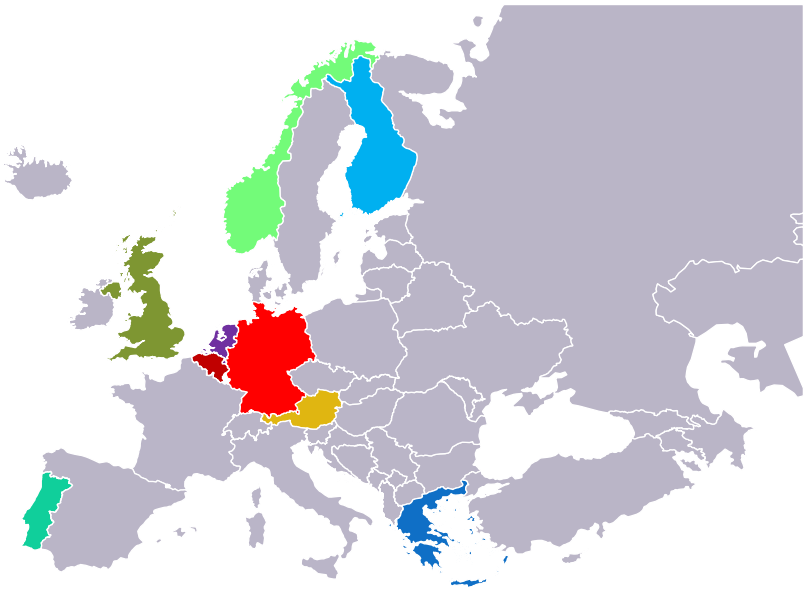

Figure 4 Geographic Spread of the Consortium

The following table illustrates each of the consortium member's main role on the project.

Partner Name/type	Logo	Country	Main role	Expertise/Contribution
EDP Utility			Exploitation & Business Model, Communication & Dissemination, demonstration validation	Participated in numerous successful EU project grants. Experience in coordinating team members for optimal results.
Vito Private Research Centre			Development of smart cell supervisor system.	Belgium's largest independent R&D organization on sustainable technology, broad-experience in battery modelling & management systems
Aviloo SME			Battery & data Analytics for EaaS platform	Specialization in battery diagnostics. Prior "Green initiative" government projects.
LR Classification Body			Certification & Standardization of waterborne transport battery	Trusted Class Society. History of vessel classifications and regulations.
KT Industrial Partner			Vessel Integration & Pilot demonstration lead	Expertise in offshore and towage. Newly designed compatible vessel. Already experience in operating electric vessels.
FS Industrial Partner			Interface developments, LCA & LCC assessments, Economic evaluation	Numerous waterborne battery system integrations. Skill in estimating cost and requirements for projects based on vessel type.
UHasselt Research Centre			Cell Technology Research	Electrochemical Engineering research group. University setting provides optimal research opportunity.
VUB Research Centre			Project Coordinator & Composite Materials Research	Extensive research into inorganic polymers and advanced composite materials.
Umi Industrial Partner			Recycling & second-life applications; LCA assessment	Recycling rechargeable batteries in all applications since 2006.

				Leader in advanced cathode materials.
Industrial Partner			System integration activities on vessel & onshore infrastructure	Global leader in smart technologies and complete lifecycle solutions for marine and energy markets.
Rhoé SME			EaaS platform development	Rhoé is active in the field of smart cities as well as in the smart management sector and develops intelligent digital hardware and software solutions for the marine sector.
Leclanché Industrial Partner			Deployment and adaptation of novel Cells and Battery system	Leclanché, a leading battery energy storage solution provider, will lead the development of the waterborne transport battery system.

Table 5 Consortium Member Roles

3.2. Organisation

The managerial organisational structure of the Consortium comprises of the following:

1. General Assembly; the ultimate decision-making body of the consortium
2. Executive Board; shall consist of the Project Coordinator, the Technical Project Manager, and any optional parties appointed b the General Assembly
3. Project Coordinator; the legal entity acting as the intermediary between the Parties and the Funding Authority
4. Technical Project Manager: in addition to its responsibilities as a Partner, shall be responsible for establishing, directing, and monitoring the execution of the work packages
5. Project Steering Committee: the "core group" assuming the executive decision making and supporting the TPM in relevant management aspects and it is composed by WP leaders

3.3. Description of Roles

3.3.1. General Assembly – GA (All Partners)

The GA is composed of at least one representative of each partner. It is the high-level management body of Current Direct and it is responsible for the approval of the management structure, the project direction, and the Consortium Agreement. The GA brings together all the partners to discuss the project's progress, to reinforce cohesion between them and to raise awareness about the project.

The GA will be responsible for all important decisions of general nature within the frame of the Consortium Agreement signed among all partners and the Grant Agreement signed with EC. Some of the decisions taken during the GA may affect the agreements stated in these two contracts, as in the case of, but not limited to: changes in the consortium composition, changes in the work plan, major technical decision, changes in the management structure, contingency plans and planning altering the resources or the time for the implementation of the project.

All GA members will have to perform the technical tasks accordingly to the timing and work plan, the members will be responsible to provide the requested activity reports and cost breakdowns as scheduled, performing the individual administrative issues, and assisting the project meetings.

3.3.2. Project Steering Committee – PSC (All WP Leads)

The PSC oversees the strategic planning and direction of the project, tracking the project's progress and the review of milestones and deliverables. The PSC is also responsible for the project risk management, the establishment of the risk assessment and its related contingency plan, the approval of the periodic technical and financial reports, the final report, and the project deliverables before submission to the EC.

The PSC will also provide the approval of networking activities with other related European projects and initiatives, the approval of the dissemination and communication plan and the exploitation plan, and the monitoring of their deployment, as well as the approval of Stakeholder Management Plan and the revision of Data Management Plan.

3.3.3. Project Cordinator – PC

The Project Coordinator main responsibility is to ensure the proper and timely execution of all the activities. The PC supported by the Project Steering Committee is responsible for the day-to-day legal, administrative, and financial issues:

1. Ensure the timely and effective overall progress of the project
2. Being the unique contact point with the European Commission
3. Interface between the consortium and the EC.
4. Responsible for the circulation of respective information and communications
5. Deal with all the aspects related to payment of financial contributions

3.3.4. Technical Project Manager – TPM

The Technical Project Manager is responsible for establishing, directing, and monitoring the execution of the work packages on a day-to-day basis. In particular, the Technical Project Manager shall be responsible for:

1. Ensure the timely and effective overall progress of the project
2. Keeping the address list of beneficiaries and other contact persons updated and available
3. Establishing and updating overall technical requirements and scope of the program
4. Coordinating the roles of each beneficiary and reviewing/approving changes to these roles
5. Monitoring the progress of each beneficiary towards their technical objectives

6. Drafting and maintaining the Consortium plan
7. Creating and maintaining the project schedule
8. Collecting and reviewing reports and other deliverables to verify they meet project objectives before submission by the Coordinator to the Funding Authority
9. Transmitting documents and information connected with the Project to any other Parties concerned
10. Managing the exploitation and dissemination of results per the Consortium Agreement

3.3.5. Work Package Leads – WPL

The Work Package Leads are responsible for monitoring and controlling the advancement of the tasks grouped in the Work Packages (WP), as well as coordinating and overseeing the work under their responsibility. Through its coordination, it will bridge the different project teams that collaborate aiming to exchange intermediate results. The WPL will always inform the TPM and PSC when modifications to the WP are needed, such as changes in the WP content (content and quality of deliverables provided) or modification in the budget (including budget allocations, subcontracting, etc). They will ensure the consolidation and execution of the tasks and related deliverables within each WP. Each organization involved will designate a WP manager.

3.3.6. Task Leaders – TL

Task Leaders will follow up the technical progress of their specific task and the coordination with the other dependent tasks within the WP and the whole project. They will ensure the advancement of the task accordingly to the timeline, as well as its proper execution. TL will report to the WPL in case of any deviation or risk. TLs will lead the preparation of the deliverables corresponding to their tasks and they are responsible for the preparation and delivery of internal task progress reports to the WP leader.

3.3.7. External Expert Advisory Board – EEAB

The Current Direct consortium recognizes its Advisory Board to be a key voice in the project. The AB will provide qualitative advice to the PSC concerning requirements, project objectives, impacts, standardization, exploitation, and dissemination of the waterborne battery.

The AB assembled during the first months of the project, starting from the stakeholders already involved in Current Direct through the letters of support followed by strategic stakeholders covering all the identified target groups, that will be engaged through a series of regional and national workshops. AB members will participate in formal meetings (connected to GA meetings) and conference calls, providing written feedback. AB members will have an influential impact, driving the project and ensuring that the Current Direct battery is appropriate for end-user needs.

The AB will also serve as the core and relevant body for the dissemination and exploitation actions of the project results, enabling replicability and propagation of the Current Direct solution.

3.4. Communication with the Commission

The Project Coordinator and Technical Project Manager will maintain regular contact and communication with the project officer on a range of matters. Communications will take a variety of forms ranging from e-mail exchanges, virtual meetings, and phone calls. During the early stages of the project, it is foreseen that travel is still severely restricted owing to Covid-19. Once travel restrictions are relaxed and a new hybrid way of working is adopted interaction with the commission is likely to be a mix of main virtual and some in person engagement as required.

4. PROJECT MEETINGS

Any Party which is a member of a Consortium shall provide adequate representation in all project meetings, as follows:

- should be present or represented at any meeting
- may appoint a substitute or a proxy to attend and vote at any meeting
- shall participate in a cooperative manner in the meetings

All meetings shall be convened according to the ongoing project schedule with adequate notice provided to each partner as soon as possible and no later than the minimum number of days preceding the meeting, as indicated in the table below.

Meeting Type	Ordinary Meeting	Extraordinary Meeting	Agenda
General Assembly	30 calendar days	7 calendar days	10 calendar days, 3 calendar days for an extraordinary meeting
Executive Board	4 calendar days	3 calendar days	3 calendar days
Project Steering Committee	7 calendar days	3 calendar days	3 calendar days
Work Package and Task Meetings	3 calendar days	N/A	1 calendar days

Table 6 Notice of Project Meetings

The chairpersons of each meeting type shall prepare and send each attendee the agenda no later than the minimum number of days preceding the meeting.

The Technical Project Manager shall chair all meetings of the General Assembly, Executive Board and Project Steering Committee.

The chairperson of each meeting shall produce written minutes of each meeting which shall be the formal record of all points discussed and decisions taken and shall be sent to all attendees within 10 calendar days of the meeting. The minutes shall be considered as accepted if, within 15 calendar days from sending, no attendee has sent an objection in writing to the chairperson with respect to the accuracy of the draft of the minutes.

4.1. General Assembly

General Assembly meetings shall be convened at least once per year, or at any time upon written request of the Executive Board or 1/3 of the Members of the General Assembly.

The Technical Project Manager shall chair all meetings of the General Assembly, unless decided otherwise in a meeting of the General Assembly.

In the General Assembly, decisions shall be taken by a majority of two-thirds (2/3) of the votes cast. The project partners agree to abide by all decisions of the General Assembly

4.2. Executive Board

Executive Board meetings shall be convened at least quarterly, or at any time upon written request of any Member of the Executive Board.

The Executive Board shall consist of the Coordinator, the Technical Project Manager, and any optional Parties appointed by the General Assembly. The Technical Project Manager shall chair all meetings of the Executive Board.

In addition, the Executive Board shall collect information at least every 6 months on the progress of the Project, examine that information to assess the compliance of the Project with the Consortium Plan and, if necessary, propose modifications of the Consortium Plan to the General Assembly

In the Executive Board, decisions shall be taken by simple majority (51%) of the votes cast.

4.3. Project Steering Committee Meetings

PSC meetings shall be convened each month, or at any time upon written request of any work package lead. The Technical Project Manager shall chair all meetings of the PSC.

During the PSC monthly meetings, the following agenda topics shall be covered to continuously monitor the implementation of the project action:

- Overall Summary
- Consortium Issues
- Milestone Status
- Deliverable Status
- Work Package Summary
- Task Summary
- Financial Summary
- Risk Status
- Action Status

In the PSC, decisions shall be taken by simple majority of the votes case from the attending partners. The PSC meetings shall proceed each month assuming more than 2/3 of the PSC partners are present. If this is not the case, then the meeting date/time shall be adjusted to accordingly.

4.4. Extraordinary Project Meetings

Extraordinary project meetings can be requested at any time by any members of the General Assembly, Executive Board and Project Steering Committee so long as sufficient notice and preparatory material provided to convene the meeting.

Extraordinary project meetings are specially called to discuss a particular item, issue, or decision of the project, usually one of some importance that cannot be dealt with via the schedule or ordinary meetings.

The chairperson shall typically be the Technical Project Manager. In any situation involving the TPM, an alternative chairperson shall be nominated from the General Assembly.

Any agenda item requiring a decision by the Members of a Consortium Body must be identified as such on the agenda. Normal voting and quorum rules shall be applied wherever possible, however if a quorum is not reached the extraordinary meeting attendees shall be entitled to decide even if less than the quorum of Members is present or represented.

The chairperson of each meeting shall produce written minutes of each extraordinary meeting which shall be the formal record of all points discussed and decisions taken.

5. PROJECT REPORTING

The Current Direct project will prepare and submit periodic reports in accordance with the Grant Agreement requirements and according to the foreseen reporting periods:

- RP1: from month 1 to month 18
- RP2: from month 19 to month 50
- RP3: from month 51 to month 66

For each reporting period, a periodic technical report will be prepared to include the following information:

- An explanation of the work carried out by the beneficiaries per work package
- Overview of the progress towards the objectives of the action, including milestones and deliverables
- Pan for the exploitation and dissemination of results
- A summary for publication by the commission
- Answers to the questionnaire related to the action implementation
- Deviations from Annex 1 and Annex 2
- Use of Resources
- Unforeseen subcontracting

In parallel to the technical reporting, periodic financial reports will be submitted, including the following information:

- Individual financial statements from each beneficiary
- Explanation of the use of resources
- Periodic summary financial statement

In addition to the periodic report for the last reporting period, the final report will be submitted following the end of the last reporting period. The final report will include the following:

- a final technical report with a summary for publication containing:
    - an overview of the results and their exploitation and dissemination
    - the conclusions on the action
    - the socio-economic impact of the action
- a final financial report containing
    - a final summary financial statement
    - a certificate on the financial statements

The periodic and final reports will be prepared together with the project beneficiaries and submitted via the Funding & Tenders Portal Continuous and Periodic Reporting Modules.

6. PROJECT ONLINE COLLABORATIVE WORKSPACE

To support the administration of the PSC an online collaborative workspace has been set up for the project. After an evaluation of several software alternatives, the selected application for use is SharePoint Project Management system. This enables partner access to the project management tools and resources.

An example of the project Sharepoint is shown in the following figure.

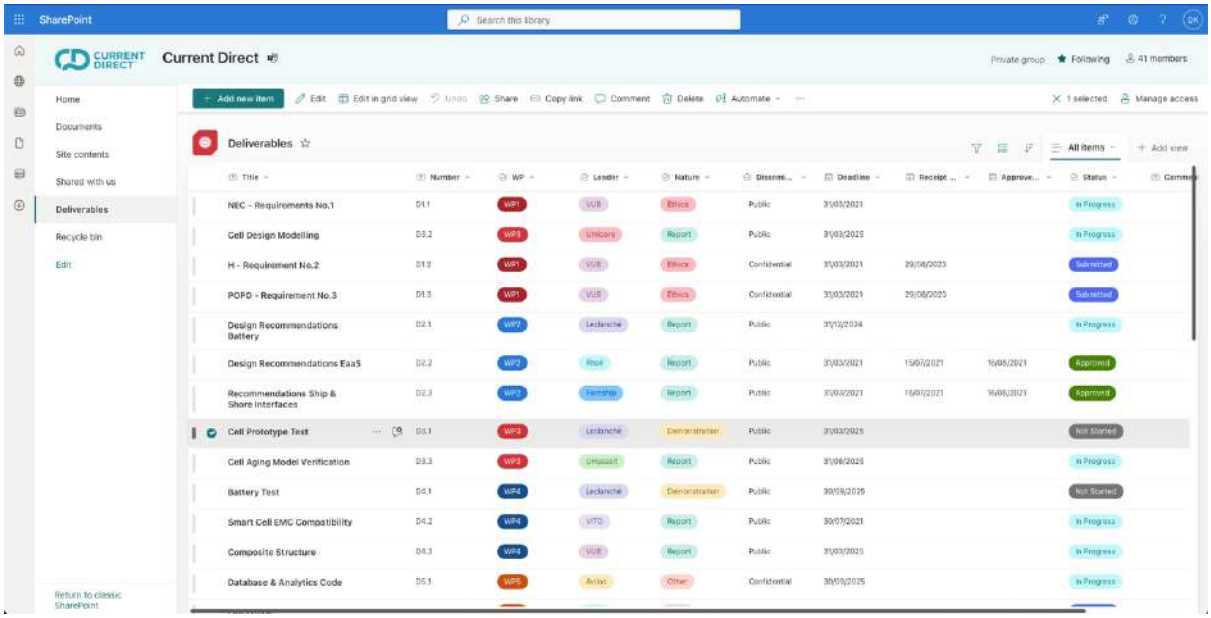

Figure 5 Deliverable Summary Dashboard

7. PROJECT CONTROL

RAID stands for Risks, Actions, Issues and Decisions and is a highly effective tool for the project management, logging, and management of all-in-one tool.

A RAID Log will be setup within M6, and this will help to create a strategy for mitigating risks, managing actions, avoiding events and issues that may jeopardise the project, and for recording all project decisions.

Risks

Risks are events that will adversely affect the project if they eventuate. Evaluate their importance based on the likelihood they'll occur, along with the impact on the project if they do.

Ask: What events might occur that will have a negative impact?

Actions: Implement risk mitigation strategies based on the criticality of each risk.

Actions

Actions are what needs to be done to complete a task or respond to an issue. Actions, whatever they are, need to be charted and assigned and action owner

Ask: What actions need tracking and recording?

Actions: Refer to ths list and check off those actions that have been completed to make sure theres follow up

Issues

Issues are events that have an adverse impact on the project. They are risks that have eventuated, and you must manage ASAP to keep the project on track.

Ask: What must we deal with to make the project run to plan?

Actions: Contain or remove the issue.

Decisions

Decisions are how the project partners decided to act so the project can progress and succeed. Decisions are the thought process of the project, a record of what decisions were made, who made them and why.

Ask: What decisions decisions need to made over the course of the project?

Actions: Monitor and manage decisions.

Figure 6 Project RAID Control

The Technical Project Manager shall be the owner of the RAID Log. The RAID log will be updated frequently and shared collaboratively between the project partners, providing the ability to make updates directly into the document.

7.1. Project Risks

Innovation and risk management are critical tasks to ensure Project Implementation Risks (non-technology related risks) are identified and mitigated. A risk management plan has been established that includes risk identification, qualification / quantification, and response planning. The risk management plan will be updated during the project according to the inputs received from other WPs.

The project risks are managed in the project SharePoint site and are monitored and discussed at the monthly PSC meetings. The dashboard provides an up-to-date snapshot of the project risks, their status, category, partner ownership and to which work packages and tasks the risk is applicable.

The project risk management plan is a living document that is constantly referred to and updated throughout the project lifecycle, since risks identified at the start of the project will develop and new or emerging risks will need to be added and tracked.

The project will actively manage all 'high' risks that could have a significant impact on the project execution and achievement of milestones and deliverables. Additionally, unforeseen risks will be captured that could have an impact on the project success.

An example of the project risk register is shown below.

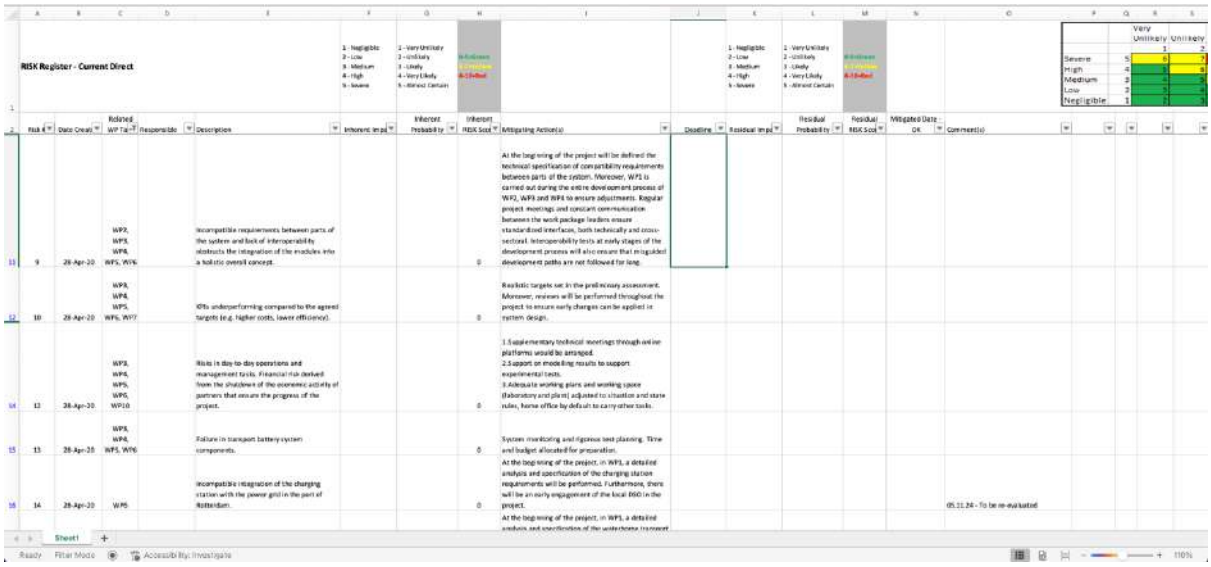

Figure 7 Project Risk Register

7.2. Project Decisions

The overall management will be executed by a teamwork organizational model and decisions will be accepted by seeking consensus amongst the partners.

In general, all main technical issues and related decisions are communicated to all partners, even if they are not directly connected to that issue. The approval of a 2/3 majority of partners might be applied for the resolution of conflicts, to avoid deadlocks in project progress. Either PSC or the PC can launch the conflict resolution procedure.

Decision making by elections are legitimate if at least 50% of the involved partners submit a vote. Decision making for important matters within the scope of the Consortium Agreement signed by all the partners and of the Grant Agreement signed with the EC, especially when such decisions can affect the agreements reached in these two contracts, will be faced by the GA.

Main rules for decision making are:

1. Persons involved will be nominated by their partner organizations
2. Votes can be delegated to other partners by prior communication by e-mail to the chair of GA and PSC

3. All partners have the same voting rights independently of their economic and technical contribution
4. Normal decisions to be taken in the GA (min. quorum 3/4 of the members, excluding non-European partners) and the PSC (min. quorum 6/8 of the members) will be taken upon 2/3 of the votes
5. As the technical implementation of the project will be the collective responsibility of the participants, should a participant breach the contract, the consortium will make all the approaches to make good this breach. If this is not possible, the remaining participants will implement the project

Decision making in the administrative domain is the responsibility of the PC with the support of TPM and PSC. Individual financial decisions are primarily the responsibilities of the partner itself.

Decision making on technical aspects affecting a specific WP or task will be preferably solved by the WPL or TL participants. In case of disagreement or when the decision affects more than one WP, first, the partner or partners involved committed will try to resolve. In case when the disagreement is not solved, the following steps will be pursued in their respective order:

1. Involvement of the Technical Project Manager to resolve the issue
2. Involvement of the Project Coordinator
3. Notification to the GA

7.3. Project Documents

Project documents will use a template that will ensure consistency of presentation and control. The project template is designed in accordance with the project style guide, logos, and colours.

The project template will include a cover sheet and document properties page to capture the following information:

- Project Information
  - Program, Acronym, GA number, Deliverable Number, Work Package / Related Task
- Document Information
  - Name, Date of Delivery, Status and Revision, Number of Pages
- Responsibility
  - WP Lead, WP Partners, Reviewers, Approver
- Dissemination Level
  - Type – Distribution Level
- Revision History
  - Version, Issue Date, Changes Made / Reason for Issue

All project documentation will be marked to indicate the following disclaimer:

This document reflects only the author's view and the Agency is not responsible for any use that may be made of the information it contains

Project Documents will be codified to keep track of the changes and the different versions. The coding structure is presented as **CD_DIN_Title_vX.X,** and based upon the Document data and parameters as follows:

- **CD**: Project identifier, in this case, CD for Current Direct project
- **DIN**: Document specific identifier:
    - Deliverable: DX.X. where X.X are the numbers assigned to each deliverable
    - Minutes of Meeting: MoM_YYMMDD where YYMMDD is the date the Meeting occurred
    - Technical Report: TR### where ### will be their numerical code order by creation order
    - Progress Report: PR### where ### will be their numerical code order by creation order
    - Drawing: DWG### where ### will be their numerical code order by creation order
    - Test Plan: TP### where ### will be their numerical code order by creation order
    - List: LST### where ### will be their numerical code order by creation order
    - Presentation: PPT### where ### will be their numerical code order by creation order
    - Recording: RCD### where ### will be their numerical code order by creation order
    - Other: OTH## where ### will be their numerical code order by creation order
- **Title**: Title of the document
- **vX.X**: Version number of the document. First "X" varies from 1 to 9 due to major modifications. Second "X" varies from 1-20 according to light modifications

For example, the final version of this deliverable will be encoded *CD_D10.1_Initial Project Management Plan_v1.0.*

7.4. Quality assurance procedure

The quality assurance procedure that has been followed in our project includes an internal review of deliverables by relevant partners (e.g., partners working on the same Work Package), as well as oversight from the technical coordinator.

Project Steering Committee meetings were held regularly to discuss and decide on issues related to strategic planning, track progress, and review milestones and deliverables.

To facilitate efficient management and collaboration, an online collaborative workspace was implemented, using the SharePoint Project Management system. This system provided updates via a dashboard, displaying the status of milestones, deliverables, work packages, tasks, and financial reporting. The PSC also oversaw the approval of networking activities, dissemination and communication plans, exploitation plans, stakeholder management, and data management plans.

Furthermore, we conducted monthly WP meetings led by the WP leaders, who are responsible for monitoring and controlling the progress of their respective tasks, ensuring coordination and oversight.

8. PROJECT FINANCE MANAGEMENT

The Project Coordination team is responsible for managing and reporting on the project's budget and effort consumption at the project level to the European Commission throughout the duration of the project. During the internal semi-annual, interim, and annual progress reports, it will collect present and review the project's effort and cost performance for the previous period. The performance is measured comparing actual consumption against planned and is based on partners' input.

Effort and Cost Management Approach

Effort and costs for this project will be managed at the Work Package level. The financial performance of the project will be monitored through comparisons between the actual effort and the effort and cost baselines. The activity effort is detailed at the task level and costs at the WP level. To avoid confusion and complications due to conflicts between National and European Union reporting rules, all efforts are to be reported in Person Months and Euro amounts are to be reported in two decimals.

Reporting Effort and Budget Consumption

The following reports are established:

- Periodic Progress Reports (for external reporting to EC)
- Semi-annual Progress Reports (internal reporting to Project Coordination team)
- Short progress reports (internal reporting before each General Assembly meeting)

Unplanned Expenses

The Annex 1 to the Grant Agreement details a budget for each partner and for each task or activity in Current Direct. For readability purposes, this is provided in Appendix B Overall budget per partner.

Any effort or cost allocation which deviates from this plan presents an unplanned expense. In general terms, unplanned expenses are not allowed. However, due to the realities of implementing a project, there is the possibility that reasonable and justifiable expenses contributing to the project and not contradicting the rules of the project may be eligible.

If a partner has a cost which they believe falls under this category, they must obtain permission from the EC Project Officer before incurring the cost. To do so, partners need to discuss the issue with the PSC and their WPL. If they concur, they should e-mail the Coordination team with a justification to the cost in order to obtain approval from the Project Officer. Following due diligence, the Coordination team may reject the justification and inform the partner or accept it and forward the request and justification to the Project Officer. Once the Coordination team receives a response from the Project Officer they inform the partner about it.

For travel outside the European Union for dissemination, the procedure is particularized as follows: Partners must send a request via e-mail to the dissemination leader well in advance of the trip. The e-mail must contain the following information:

- Who is travelling
- Destination of the trip
- Date of the trip
- The trip's relevance to the CD project.

The dissemination leader (WP9 Leader) will examine the request and upon approval will forward it to, with the recommended action, to the Coordination team. In the event the request is accepted, the Coordination team will forward the request to the Project Officer who has the final say on the matter. The partner will be informed of the decision.

9. PROJECT INNOVATION MANAGEMENT

Innovation management is key for boosting competitiveness and sustainable growth in Europe. An effective innovation management system will be present throughout project processes, understanding the emerging market conditions, identifying technical barriers, and ensuring the developments and results of the project are released in a coordinated manner, designed to stimulate the market for marine batteries and services.

The Current Direct consortium is balanced with a range of complementary knowledge, skills and expertise which contribute to the innovation management processes, and the workplan has been carefully designed to strengthen this aspect.

The project structure will implement all phases of the innovation process, following the EU standard for Innovation Management CEN/TS 16555-1 REF where a systematic innovation management process is defined. This concept is applied to the innovation management of Current Direct - incorporating continuous assessment, improvement, and planning to all stages of idea management, the development of the project, exploitation, and market introduction. These fundamental principles will be applied across all work packages, and a dedicated section on innovation management will be delivered as part of this deliverable at the end of the project.

10. CONCLUSION

The Project Management Plan provides an overview of how the management and governance of the project will be performed. It describes the meetings that will be held and specifies which decisions are taken at various levels.

By adhering to this plan, the project aims to achieve its objectives efficiently and effectively, fostering collaboration among partners and ensuring alignment with the overall project goals. The plan also addresses project risks, decisions, and quality assurance procedures.

Additionally, it includes project finance management and innovation management strategies to support the successful completion and commercialization of the project outcomes. Continuous updates and refinements to the plan will be made to adapt to any changes and ensure ongoing compliance with requirements.