CURRENT DIRECT™
NEWSLETTER

Current Direct News | July 2021, 1st issue

Changing the way we move people and goods by water to create a sustainable uncompromising future

Current Direct is a European Horizon2020 funded project with the ultimate goal to revolutionize the way we move goods and people by water. This will be achieved by developing and demonstrating an innovative interchangeable waterborne transport battery system supported by an Energy as a Service (EaaS) Platform that facilitates fast swapping, fleet optimization and novel business models. The system will be demonstrated in an operational environment at the Port of Rotterdam reaching a technological readiness level (TRL) of 7.

Current Direct aims to:

(i) significantly reduce the total lifetime cost of waterborne transport batteries by 50% through novel materials, manufacturing processes, and optimized components,

(ii) cut greenhouse gas emissions of the marine transport sector through electrification of existing vessel fleets,

(iii) increase the installed energy of containerized energy storage systems by 300% compared to currently available systems,

(iv) trigger investments for innovation, employment, and knowledge creation in the European marine transport and battery sector through the development of a technological solution.

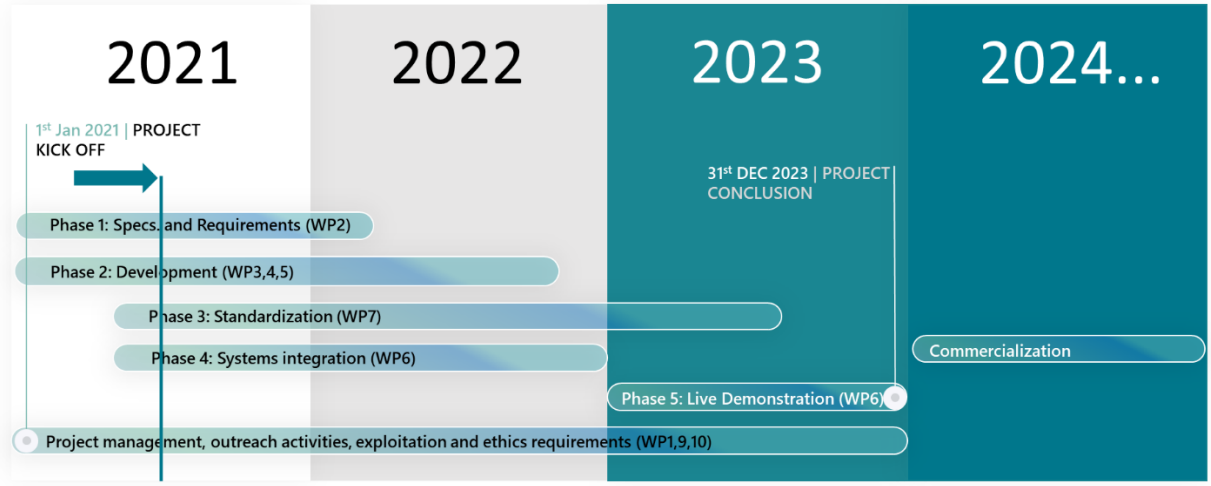
The Current Direct project is funded by European Union's Horizon 2020 research and innovation programme under grant agreement number 963603

Project Updates

Welcome to the first edition of the Current Direct newsletter!

The newsletters will be issued twice a year with the aim to provide an overview of the latest news, development and general progress of the project.

Current Direct is organized in five different phases, which are supported by the Project management and outreach activities that run throughout the whole duration of the project. Those phases are then followed by the commercialization of the Current Direct system, which will begin at the project conclusion.



Six months have passed since the Current Direct project Kick-off and the Consortium has come together to successfully achieve the first project milestone (MS1) in Month 3 verified through the submission of the first project deliverables.

In these early months of activity, the Consortium effort has been focussed on **Phase 1**: *defining specifications and requirements* for the two main technology pillars: the waterborne transport battery system and the EaaS platform (Work package 2); and on **Phase 2**: *system design development*, that covers Work packages 3,4 and 5.

Phase 1: Foreship, with the support of the consortium partners, has finalized the first revision of Deliverables D2.1 – Design Recommendations Battery, D2.2 – Design Recommendations EaaS and D2.3 – Design Recommendations Ship and Shore Interfaces, which are publicly available on our website (https://www.currentdirect.eu/). Given a large number of requirements, a unique and bespoke requirements validation tool was created to enable value engineering on all collected requirements, which are undergoing refinement and finalisation. With the help of several partner workshops, the refined requirements will be included in the revised versions of the project deliverables.
In addition, a comprehensive white paper titled: *Container Battery Energy Storage System AC vs DC Decision* has been released and can be downloaded here. The paper addresses one of the key early decisions on the project concerning the differences of both AC voltage and DC voltage solutions for the Current Direct battery container. The paper guides the reader with arguments on the benefits and drawbacks of the different systems with the conclusion for the DC voltage solution endorsed.

Phase 2: In connection with the definition of requirements and specifications, work has been focused on **system design development**. Within this phase, three main workstreams have been carried out in parallel.
The first one (Work package 3), led by Blackstone Technology, focuses on the design and manufacturing of a lithium-ion cell with an aqueous-based NMC cathode. Within the first six months from the beginning of the

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project, the electrochemical design of the cell is maturing (Figure), following Umicore's recommendations collected in Deliverable D3.2 – *Cell Design modelling.* The technology samples have been tested with promising results. Furthermore, Blackstone Technology is setting up its production facilities to start with the production of the Current Direct NMC Cell expected in the third quarter of 2021. Concurrently, the University of Hasselt worked jointly on compiling a standard characterization test plan as a reference to test Current Direct cells for safety, performance, and lifetime characterization. This document has been finely tuned to support the requirements of Task3.3 which aims at the development of a physics-based model.

The second workstream (Work package 4), led by Spear is focused on the development of the waterborne battery system. In the considered period, Spear has focused on Battery System innovation, through a series of brainstorming and concept generation sessions, to derive concept options for further refinement during the development phase. Spear has also undertaken extensive technical market research and analysis to identify suitable BMS Ultrasound Sensor suppliers with investigations ongoing. Vito has progressed the Smart cell supervisor development roadmap to outline the activities required for verification and testing whose initial results are included in Deliverable D4.2 - *Smart Cell EMC Compatibility*. Finally, VUB has completed several iterations of Composite Material combinations and undertaken initial thermal characterization testing.

The third and last workstream (Work package 5), within phase 2 is led by Rhoé and is dedicated to the development of the innovative EaaS Platform and Battery Analytics Database and Software. This workstream kicked off in the ides of April and it aims to be completed by the end of September 2022. Since then, Rhoé has led a thorough literature review process that pinpointed transferrable attributes of battery swapping services from other industries (e.g., electric vehicles). Currently, the core control unit is being developed, with the support of partners across the Current Direct consortium. Furthermore, Aviloo, in close cooperation with Rhoé and Spear defined the functionality and structure of the Battery Analytics Platform. The main focus relies on establishing a thought-out communication of the different systems and data processing within the Battery Analytics Platform.

In connection with phase 1, Lloyd's performed the first steps of **phase 3** with the ultimate goal to standardize for scale and create a standardized certification methodology for swappable marine battery systems. Lloyd's is taking the route to identify the mechanical, electric power and signals characteristics among available technologies and similar existing projects under development within the European Countries. This will allow the Current Direct system to be suitable for a standardized application within the EU Ports and the ships to be provided by swappable containers both from Current Direct and from other similar technologies.

Phase 4: In anticipation of the Current Direct system integration and demonstration, work has started on mapping out the critical activities and schedule that will be performed under Work package 6. Further information will be shared on this phase as the project progressed in the next Newsletter at the end of 2021.

In addition, the following WP9 and WP10 updates have been achieved on the **project management and Communication and Dissemination** side:

- The Project Steering Committee has been set up and meets monthly to effectively manage the technical, administrative and financial aspects of the project
- Spear and VUB developed the Project Management Plan and put in place OpenProject which will serve as the online collaborative workspace for the project. A Risk, Actions, Issues & Decision Log has also been implemented to serve as an effective tool for project management.
- **Current Direct website** is online: https://www.currentdirect.eu/.
- **Current Direct LinkedIn page** is live: https://www.linkedin.com/company/currentdirect/
- The dissemination and Communication plan (D9.2) has been developed by EDP NEW and can be downloaded here from our website

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Available Project Results

The Current Direct project has published the following Project Deliverables and Documents during its first six months. All publicly available project documents can be found on the project website and easily accessed from the links below.

Deliverable 2.1 – Design Recommendations Battery
Deliverable 2.2 – Design Recommendations EaaS
Deliverable 2.3 – Recommendations Ship & Shore Interfaces
Deliverable 3.2 – Cell Design Modelling
Deliverable 4.2 - Smart Cell EMC Compatibility
Deliverable 9.2 – Dissemination & Communication Plan
AC vs DC Container White Paper

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Latest News and Events

Current Direct project Kick-off

On **January the 1st 2021** the Current Direct project officially started!
Due to Covid19 restrictions, the project's kick-off meeting took place virtually on January the 5th**.**

Current Direct project was presented at China International Battery Fair (CIBF)

On **March 19th 2021** our consortium partner Foreship presented the Current Direct project at the China International Battery Fair (CIBF).
The International Battery Fair Summit is the world's largest trade fair devoted to batteries and takes place every two years in Shenzhen presenting itself as an ideal platform to demonstrate the competitiveness of companies, to build production capacity and to learn about the latest technologies, trends and innovations on the market. Current Direct project's key attributes were presented, and special emphasis was placed on how the EaaS platform coupled with the containerized Battery Energy Storage will enable Greenhouse gas (GHG) emissions reduction within the European waterways.

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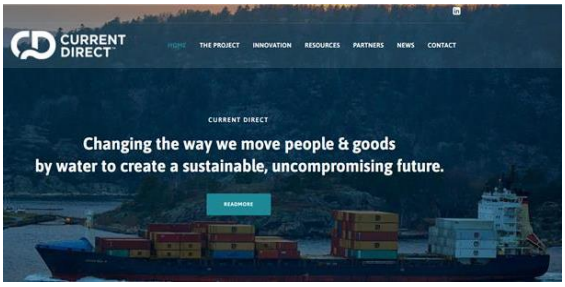
Current Direct project was presented in the Maritime Battery Forum (MBF) webinar

On **April the 22nd 2021** Spear, as project's technical coordinator, presented the Current Direct project in the **Maritime Battery Forum** webinar. The Maritime Battery Forum, established in 2014, is a meeting place for exchange of knowledge based on experience from the usage of batteries within the shipping and offshore industries.



Current Direct website launch

On **April the 26th 2021** the project's website has officially been launched. The website is part of the dissemination & Communication activities and it will be the main communication channel for the project. The website is constantly updated with the latest news and also collects all the documents and deliverables submitted along the project lifetime.

Current Direct project was presented in the Maritime Hybrid, Electric and Fuel Cells webinar

On **June the 22nd 2021**, Current Direct technical project coordinator Shaun White had the opportunity to present the Current Direct project at the webinar: *Hybrid and all-electric: the next steps in electrifying the world's shipping industry* within the Maritime Hybrid Electric and Fuel Cells Webinar week. The take-up of hybrid and electric technologies by the maritime and shipping industries is being driven by the zero-emission targets set out by governments around the world. This webinar addressed key considerations in the design, build and operations of hybrid and all-electric vessels as well as reviewing what the fleet of the future may look like.

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Upcoming Events

Applicability of containerized ESS on inland waterway and coastal shipping

Jan-Erik Räsänen
CTO
Foreship Ltd
Finland

Onshore infrastructure for electrification of swappable containerized battery systems

Samson Tesfahunegn
Senior engineer
Wärtsilä Norway AS
Norway

Current Direct: EU project for swappable container waterborne transport batteries

Shaun White
Senior project manager
Spear Power Systems
UK

Three Current Direct will have the opportunity to present at the Electric & Hybrid Marine Virtual Conference

The Electric & Hybrid Marine Virtual Conference will take place from **13th to 15th September 2021** and will provide a crucial platform for shipowners and operators, boat builders, propulsion system designers and manufacturers, and of course port operators, to engage with speakers and suppliers who will present the next generation of electric and hybrid marine propulsion technologies. We are proud to announce that Current Direct will actively participate in the live conference and three partners from the Current Direct consortium have been invited to present the following three topics:

- Applicability of containerized Energy Storage Systems (ESS) on inland waterway and coastal shipping
- Onshore infrastructure for electrification of swappable containerized battery systems
- Current Direct project's overview including goals and ambitions

Click here for registration.

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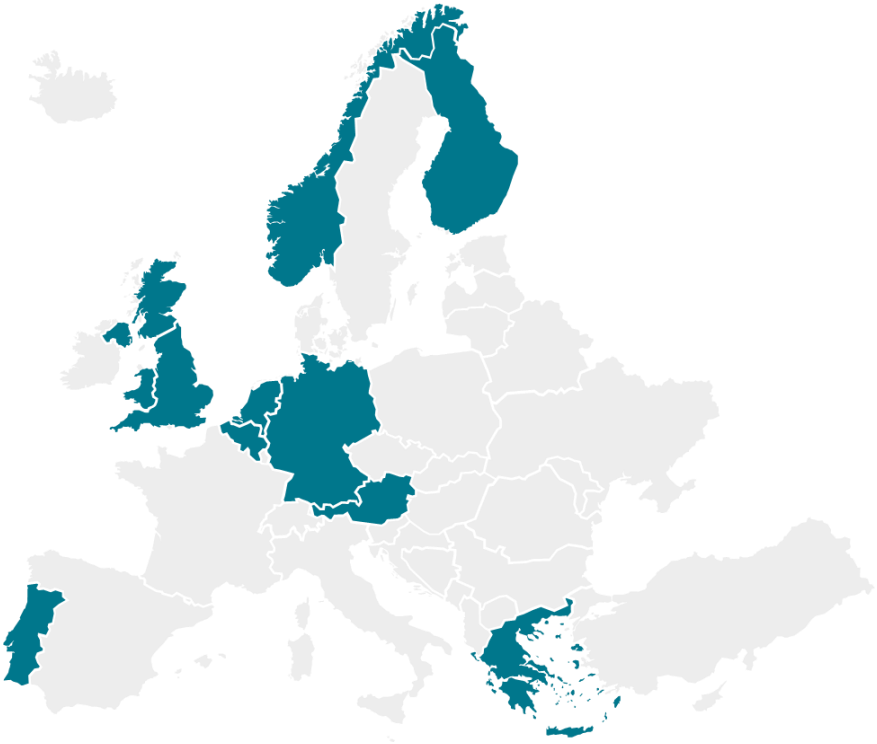

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