

EUROPEAN COMMISSION

HORIZON 2020 PROGRAMME - TOPIC H2020-LC-BAT-2019
Strongly improved, highly performant and safe all solid-state batteries for
electric vehicles.

GRANT AGREEMENT No. 875189



SAFELiMOVE – Deliverable Report
D2.1 – Specifications, performances & cost
requirements for small and large cells

Deliverable No.	SAFELiMOVE D 2.1	
Related WP	WP2	
Deliverable Title	Specifications, performances & cost requirements for small and large cells	
Deliverable Date	2020-04-30	
Deliverable Type	REPORT	
Dissemination level	Confidential – member only (CO)	
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Status	Draft 2.0	

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 875189. The information and views set out in this publication does not necessarily reflect the official opinion of the European Commission. Neither the European Union institutions and bodies nor any person acting on their behalf, may be held responsible for the use which may be made of the information contained therein.

Publishable summary

This report describes part of the activity of Work Package 2 of SAFELiMOVE project. It provides different specifications in order to ensure the achievement of SAFELiMOVE's targets in a properly and timely manner. Starting from the requirements for the final cell used in the battery-based electric vehicles (BEVs), WP2 has defined the design of different cells formats, namely 10 Ah and 1 Ah pouch cells, which will be developed within the project.

Different partners involved in this WP have developed a dynamic Excel calculation sheet which is a fundamental tool for the theoretical calculations and estimations of key cell parameters such as volumetric and gravimetric energy densities. Thanks to this tool, the final design of SAFELiMOVE cells with different formats has been successfully established, as well as the necessary parameters that will ensure the fulfillment of SAFELiMOVE's goals.

Three main scenarios have been delineated by WP2 participants and are described in this report. Each case is based on different levels of development of both materials and processing, and considers several limitations related with technical constraints raised by the partners involved in the manufacturing part of the project. Each scenario is characterized by precise specifications of cathode active material capacity and ratio between components in the positive electrode, thickness of lithium foil and thickness of the hybrid ceramic polymer electrolyte. The 3 scenarios are:

- 1. BASE CASE: the first scenario represents the starting point of the project development and employs less challenging materials, as positive electrode formulations and thicker solid electrolyte and lithium foil.
- 2. REALISTIC CASE: it is an intermediate case, more challenging than the BASE case. The advancement will pass through this intermediated phase.
- 3. CHALLENGING CASE in which the most advanced materials and technologies (thin solid electrolyte, high active material cathode formulation) will be employed to develop the final cell fulfilling all SAFELiMOVE's targets.

The cell characteristics defined for a 60 Ah cell have been adapted to 10 Ah and 1 Ah cells to prepare smaller-scale cells with equal features which will be used as prototypes for the study and development of the final battery pack.

This deliverable D2.1 resumes the work done within WP2 Tasks 2.1 and 2.2, including the creation of the calculation tool, the adaptation of real BEV's features to SAFELiMOVE goals, the definition of different cell formats, clarifications of cell performances and cost requirement. Furthermore, this report aims to provide a guideline for the execution of materials, components and prototype cell development in SAFELiMOVE project.

Appendix A- Acknowledgement

The author(s) would like to thank the partners in the project for their valuable comments on previous drafts and for performing the review.

Project partners:

#	Partner	Partner Full Name
1	CICe	CENTRO DE INVESTIGACION COOPERATIVA DE ENERGIAS ALTERNATIVAS FUNDACION, CIC ENERGIGUNE FUNDAZIOA
2	SCHOTT	SCHOTT AG
3	UMICORE	UMICORE
4	HYDRO-QUEBEC	HYDRO-QUEBEC
5	SAFT	SAFT
6	RENAULT SAS	RENAULT SAS
7	TME	TOYOTA MOTOR EUROPE NV
8	IKERLAN	IKERLAN S. COOP
9	CEA	COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
10	CIDETEC	FUNDACION CIDETEC
11	TUB	TECHNISCHE UNIVERSITAT BERLIN
12	RWTH AACHEN	RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN
13	ABEE	AVESTA BATTERY & ENERGY ENGINEERING
14	LCE Srl	LIFE CYCLE ENGINEERING SRL
15	UNIRESEARCH BV	UNIRESEARCH BV