

EUROPEAN COMMISSION

HORIZON 2020 PROGRAMME - TOPIC H2020-LC-GV-01-2018
Connected Electric Vehicle Optimized for Life, Value, Efficiency and Range

GRANT AGREEMENT No. 824295



CEVOLVER – Deliverable Report

2.4 Modular Multi-level Thermal and Energy
Management Strategy

Deliverable No.	CEVOLVER D2.4	
Related WP	WP2	
Deliverable Title	Modular Multi-level Thermal and Energy Management Strategy	
Deliverable Date	2021-11-16	
Deliverable Type	REPORT	
Dissemination level	Confidential – member only (CO)	
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Status	Final	16-11-2021

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824295. 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 deliverable reports on the task Modular Multi-level Thermal and Energy Management Strategy of the Work Package Frameworks, methodologies, models and tools for optimization of the electric and thermal management. These tasks consist of the development of features to improve electric and thermal consumption of the electric vehicle. These features focus on a different scope or horizon, going from a high level planning to a low level control of the vehicle. The features are integrated such that the low level controls are based on information coming from the higher level planning. The features consist of Eco-routing, Assured Charging, range estimation, Eco-driving, and thermal management with Smart Fast Charging. Eco-routing finds the energy-optimal route or eco-friendly time-optimal route for long distance trips with inclusion of charging stops. Range estimation is the estimation of the SoC of the vehicle embedded in the routing calculations. Eco-driving is an optimization of the microscopic driving behavior (speed profile) considering road characteristics, legal speed limits, and behavior of preceding vehicles. The thermal management with Smart Fast Charging deals with anticipatory thermal management of the cabin and powertrain as well as the pre-conditioning of the battery for a fast charge event. The features here are developed in a Matlab Simulink environment in a generic way, and will be calibrated and customized for implementation in the demonstrator vehicles in other work packages.