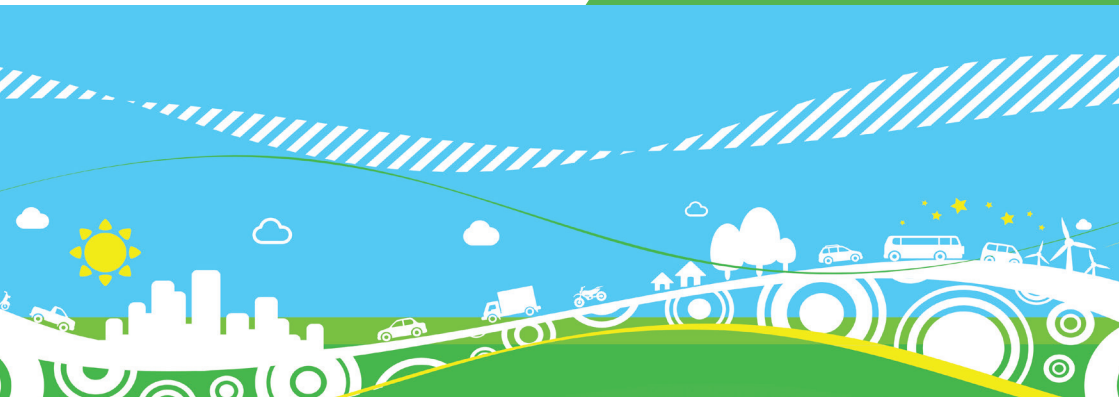
EGVI cPPP
Project Portfolio
Calls 2018 - 2019

EGVI
European Green
Vehicles Initiative

Horizon 2020
European Union Funding
for Research & Innovation



Ed: EGVIA, Av. de Cortenbergh 66, 1000 Brussels

Foreword

Through the Green Cars public-private partnership launched in 2008 and the successor European Green Vehicles Initiative in 2013, the European Union has supported hundreds of collaborative projects that have paved the way towards vehicles powered by alternative fuels as well as electric vehicles. This is a real European success story.

This new edition of the European Green Vehicles Initiative projects' portfolio showcases the results of the excellent projects funded by this partnership under Horizon 2020. Many key technical challenges have been solved and new technologies developed due, in no small part, to these collaborative research and innovation projects. Looking ahead, we need to continue to drive these technological improvements so as to lower harmful emissions from vehicles - for the benefit of all European citizens.

The most pressing challenge, responsibility and opportunity for Europe is to keep our planet and people healthy. This is the purpose of the European Green Deal, the EU's transformative new agenda to achieve climate-neutrality by 2050 while making our economy and industry more innovative, resource-efficient, circular and competitive.

Research and innovation are vital drivers for this transition to happen. New technologies, sustainable solutions and disruptive innovations are critical to achieve the objectives of the European Green Deal. To do this, we need the European R&I community to continue linking researchers with industry and societal actors and to keep connecting scientific ideas with global opportunities.

The achievements of EU-funded research and innovation projects, such as those under the European Green Vehicles Initiative, contribute real results and practical solutions to the achievement of policy targets. Equally, we need these innovations to reach the market and our citizens – translating into a strong impact for the environment, the economy and the society.

Patrick Child
Director Transport
DG Research and Innovation
European Commission

I congratulate the European Green Vehicles Initiative and the project consortia on the impressive achievements that are detailed here, and I look forward to seeing these successes sustained and expanded even further under the Horizon Europe programme that is due to start in 2021.

Stephan Neugebauer
EGVIA Chairman

I congratulate the European Green Vehicles Initiative and the project consortia on the impressive achievements that are detailed here, and I look forward to seeing these successes sustained and expanded even further under the Horizon Europe programme that is due to start in 2021.

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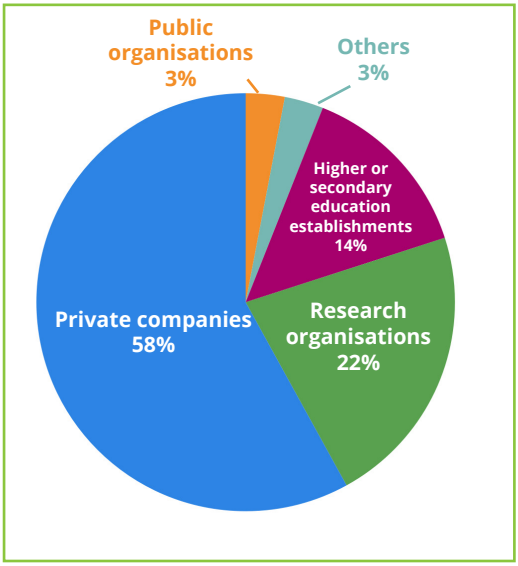
FACTS & FIGURES FROM THE EUROPEAN GREEN VEHICLES INITIATIVE

73
projects funded

Who received funding?



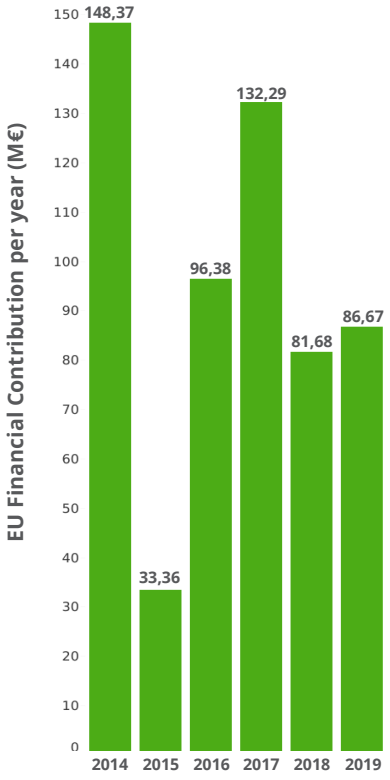
1 317
participants

208 SMEs

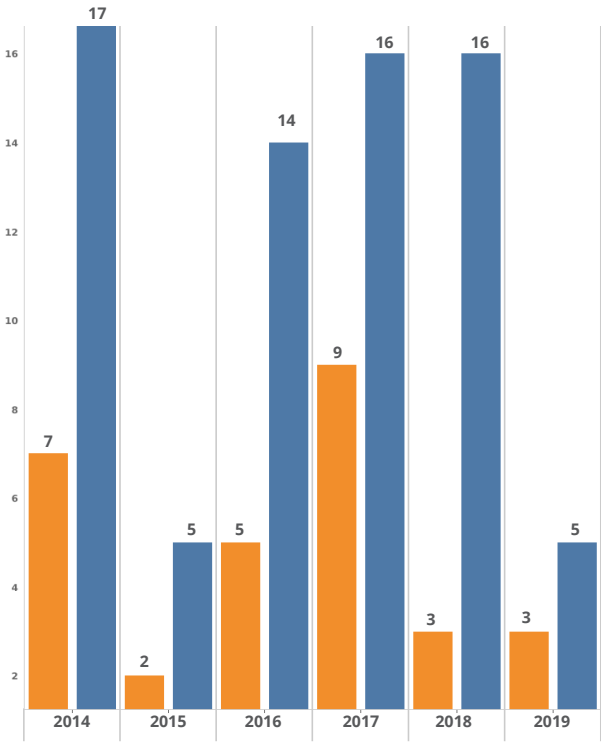
29
topics published

M€ 577
Total EU Financial contribution

Number of published topics vs Number of signed Grant Agreements



EU Financial Contribution per year in GV projects



Number of topics published

Number of signed Grant Agreements

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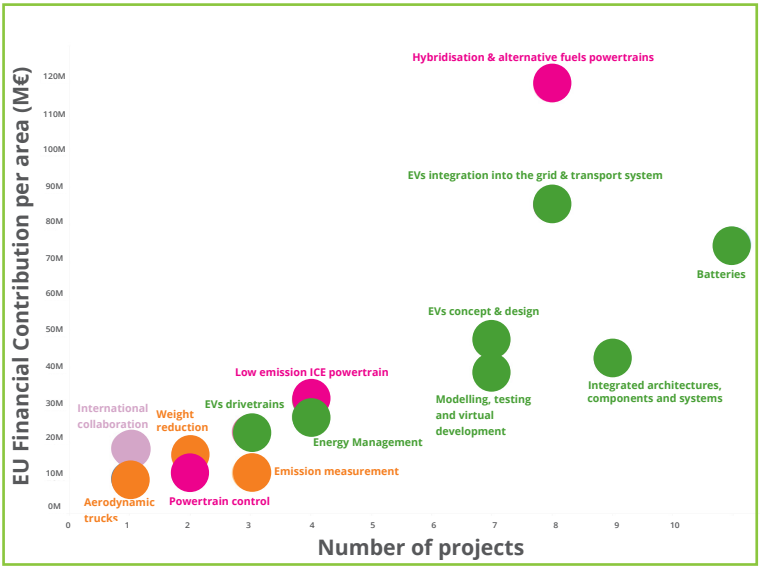
Clustering of GVs projects

*EU Financial Contribution & number of projects per area**

** Plus one ERA NET and one CSA project amounting*



Transversal topics	
6 projects	Total EU Financial Contribution M€ 36,65

Electrification and batteries	
50 projects	Total EU Financial Contribution M€ 352

Alternative fuels, hybridisation and low emission powertrains	
14 projects	Total EU Financial Contribution M€ 161

International collaboration	
1 project	Total EU Financial Contribution M€ 18

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EU Financial Contribution per country in Green Vehicles Projects

In H2020, legal entities from Associated Countries can participate under the same conditions as legal entities from the Member States

- Austria - M€ 48,65
- Belarus - M€ 0,38
- Belgium - M€ 36,68
- Croatia - M€ 0,58
- Czech Republic - M€ 3,51
- Denmark - M€ 1,95
- Estonia - M€ 0,36
- Finland - M€ 10,9
- France - M€ 72,45
- Germany - M€ 143,39
- Greece - M€ 8,8
- Hungary - M€ 1,96
- Irland - M€ 1,1
- Israel - M€ 2,8
- Italy - M€ 82,07
- Luxembourg - M€ 2,81
- Netherlands - M€ 28,88
- Norway - M€ 0,42
- Poland - M€ 2
- Portugal - M€ 0,26
- Romania - M€ 0,94
- Slovakia - M€ 0,6
- Slovenia - M€ 5,64
- Spain - M€ 52,40
- Sweden - M€ 19,9
- Switzerland - M€ 4,12
- Turkey - M€ 6,54
- United Kingdom - M€ 27,2

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Green Vehicles Projects

2018

GV-01-2018

Integrated, brand-independent architectures, components and systems for next generation electrified vehicles optimised for the infrastructure	SYS2WHEEL
	EVC1000
	TELL
	1000kmPLUS
	SELFIE
	CEVOLVER
	i-HeCoBatt
	ACHILES
	FITGEN

GV-02-2018

Virtual product development and production of all types of electrified vehicles and components	PANDA
	UPSCALE
	VISION-xEV
	XILforEV

LC-NMBP-30-2018

Materials for future highly performant electrified vehicle batteries	SPIDER
	Si-DRIVE
	LISA

2019

LC-GV-03-2019

User centric charging infrastructure	USER-CHI
	INCIT-EV
	eCharge4Drivers

LC-GV-04-2019

Low-emissions propulsion for long-distance trucks and coaches	LONGRUN

LC-GV-05-2019

InCo flagship on “Urban mobility and sustainable electrification in large urban areas in developing and emerging economies”	SOLUTIONSplus

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PROJECT NUMBER	824244		
PROJECT ACCRONYM	**SYS2WHEEL**		
PROJECT NAME	Integrated components, systems and architectures for efficient adaption and conversion of commercial vehicle platforms to 3rd generation battery electric vehicles for future CO2-free city logistics		
START DATE	01/01/2019	**END DATE**	31/12/2021
TOTAL BUDGET (M€)	6 531 672,5	**EU FINANCIAL CONTRIBUTION (M€)**	4 873 421,75
WEBSITE	https://sys2wheel.eu/		
COORDINATOR	Bernhard BRANDSTÄTTER bernhard.brandstaetter@v2c2.at		

PROJECT PARTNERS

virtual vehicle, SOFTWHEEL, Jeep TOFAŞ TÜRK OTOMOBİL FABRİKASI A.Ş., FPT POWERTRAIN TECHNOLOGIES, TTTechAuto

Coordinator IESTA, UNIVERSITY OF SURREY, Applus+ IDIADA, HiWi)))tronics, elaphe Propulsion Technologies

IVECO, AVL

AIM OF THE PROJECT

The project SYS2WHEEL aims at developing sustainable city logistics and improving mobility, accessibility and quality of life of EU citizens. 12 international project partners are committed to achieve three main objectives:

1. Reducing cost in mass production by at least 20% through components becoming obsolete and through reduction of wiring costs.
2. Increasing powertrain efficiency by improved e-motor windings, advanced rare-earth magnets, reduced powertrain rotation parts, reduced losses, advanced control and weight reduction.
3. Increased affordability and user-friendliness by enhanced modularity and packaging. Space saving approaches in sys2wheel lead to more freedom for batteries, cargo and drivers.

To meet the ambitious targets of SYS2WHEEL, the project is divided into different types of activities, 2 horizontal and 2 vertical lines, each representing one work package.

RESULTS

In the first year of the project, one major achievement was the development of requirements covering the wide range of different electric powertrains. It's the basis for the next steps, especially the basic simulation and tool development in Work Package 2.

Other highlights were the common dissemination activities together with the E-VOLVE cluster in Spain and Austria last year. The cluster is realizing synergies between six projects from the GV-01-2018 Horizon 2020 call.

A major challenge for the upcoming months is the development of the different powertrain and its components, thermal management, NVH applications and advanced control fulfilling the different requirements for our 2 main approaches for electric driving in a fleet application (e-Axle and in-wheel motor).

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PROJECT NUMBER	824250		
PROJECT ACCRONYM	**EVC1000**		
PROJECT NAME	Electric Vehicle Components for 1000 km daily trips (EVC1000)		
START DATE	01/01/2019	**END DATE**	31/12/2021
TOTAL BUDGET (M€)	6 772 943,75	**EU FINANCIAL CONTRIBUTION (M€)**	5 149 428,51
WEBSITE	http://www.evc1000.eu		
COORDINATOR	Eric ARMENGAUD eric.armengaud@avl.com		

PROJECT PARTNERS

AVL (Coordinator)
Audi
DRIV
elaphe Propulsion Technologies
brembo
TECHNISCHE UNIVERSITÄT ILMENAU
Fraunhofer ENAS
i&m Ideas&Motion
JAC ITALY DESIGN CENTER JAC
UNIVERSITY OF SURREY

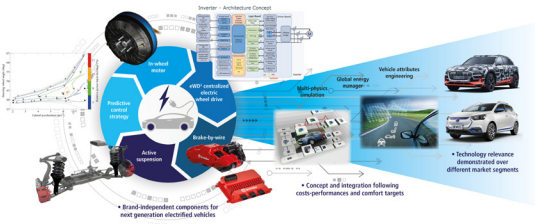
AIM OF THE PROJECT

The EVC1000 project brings together ten participants to provide innovative and mass-production optimised components enabling the efficient integration of powertrain and chassis systems, which will increase EV range and user acceptance. EVC1000 focuses on in-wheel drivetrain layouts, as well as a wheel-centric integrated propulsion system and EV manager.

More specifically, the above-mentioned points will be achieved through the design of:

- Energy-efficient, reliable, low-cost and scalable in-wheel electric motors;
- Centralized electric wheel drive family for electric axles with multiple motors and four-wheel-drive vehicles;
- Components and controllers for energy-efficient electrified chassis control (brake-by-wire, controllable suspension system, ECUs);
- Demonstration and assessment of the EVC1000 components and controllers on EV demonstrators during real-world operation.

The new EVC1000 components will be showcased in two production-ready electric vehicle demonstrators of different market segments. This will include demonstration of long distance daily trips of up to 1000 km with no more than 90 minutes additional travel time due to charging, and without additional degradation of the components. The evaluation will also consider objective and subjective performance indicators for human factor analysis with a view to deliver enhanced customer experience.



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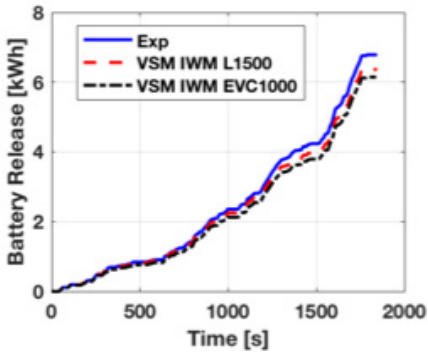
www.egvi.eu

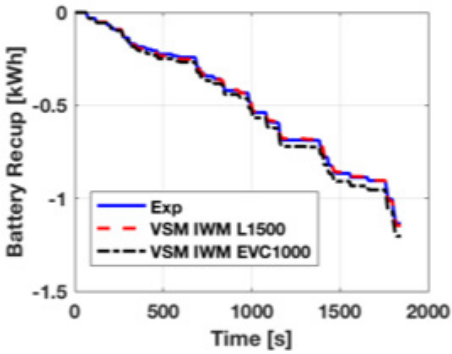
Topic GV-01-2018

RESULTS

At this stage of the project the concept has been validated by simulation and the components are being designed and validated. Parallel to this, vehicle demonstrator preparation is ongoing.

Preliminary simulation results based on physical characterization of the vehicle platform and of the components already foreseen an energy efficiency increase in the order of magnitude of 10%.





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PROJECT NUMBER	824254		
PROJECT ACCRONYM	**TELL**		
PROJECT NAME	Towards a fast-uptake of mEdium/Low-voltage eLectric power trains		
START DATE	01/12/2018	**END DATE**	30/11/2021
TOTAL BUDGET (M€)	5 674 771,25	**EU FINANCIAL CONTRIBUTION (M€)**	4 122 271,25
WEBSITE	https://horizon2020-tell.eu/		
COORDINATOR	Marco OTTELLA Marco.Ottella@infineon.com		

PROJECT PARTNERS

Coordinator

AIM OF THE PROJECT

The TELL project addresses the optimisation and large-scale manufacturing of low and medium voltage electric powertrain solutions, with focus on high efficiency, compact packaging and low cost. Three main applications are targeted:

- Small-to-medium segment electric cars
- Hybrid electric cars with a low voltage add-on electric propulsion system
- The lightweight urban mobility sector, e.g., electric quadricycles

The TELL powertrains will be demonstrated on two electric vehicle platforms: i) a four-wheel-drive vehicle operated at a nominal voltage of 100 V; and ii) a two-wheel-drive vehicle operated at a nominal voltage of 48 V. Inverters will be based on the latest Si- and GaN MOSFET/HEMT semiconductor technologies.

RESULTS

TELL is finalising a design routine to implement a novel approach in electric motors optimisation, promoting energy efficiency.

TELL is currently developing model-based control strategies to: i) efficiently distribute the tractive and regenerative braking torques between the front and rear axles of the vehicle; ii) guarantee traction capability both in straight line as well as in curves, and without affecting driving comfort.

TELL has successfully performed the preliminary benchmarking tests on their four-wheel-drive vehicle prototype, establishing the necessary communication between the available sensors/actuators and the vehicle control system unit.

Expected results:

- Novel GaN HEMTs and Si MOSFETs based inverters specifically designed for urban driving cycles
- Novel high-efficiency synchronous motors and synchronous reluctance motors assisted by permanent magnets
- Four- and two- wheel-drive architectures with improved acceleration and climbing performance, high energy recuperation, excellent fail-safe properties

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PROJECT NUMBER	824262		
PROJECT ACCRONYM	**1000kmPLUS**		
PROJECT NAME	Scalable European Powertrain Technology Platform for Cost-Efficient Electric Vehicles to Connect Europe		
START DATE	01/01/2019	**END DATE**	30/06/2022
TOTAL BUDGET (M€)	6 892 382,5	**EU FINANCIAL CONTRIBUTION (M€)**	5 405 286,26
WEBSITE	https://1000kmplus.eu/		
COORDINATOR	Reiner JOHN - reiner.john@infineon.com Florian KALLEDER - florian.kalleder@infineon.com		

PROJECT PARTNERS

Coordinator

AIM OF THE PROJECT

The need for common, scalable and brand-independent technology platforms for the key elements of EV, like the inverter-motor-transmission/gearbox (powertrain) and the battery system, is evident. The project 1000km-PLUS will ensure the superiority of European automotive key technologies in terms of performance, scalability and costs for the 2nd and 3rd generation of EV. The EV powertrain and battery technologies must now start to mature, in order to fulfil existential human mobility needs in terms of affordability and usability: this is the key to enter the early mass market. It assumes ramp-up of series production and affordability by economies of scale.
1000kmPLUS will provide key arguments regarding the usability of the 2nd generation of EV to the Early Majority customers. Further, it will speed up the development and the ramp-up of series production of the 3rd EV generation.
To obtain breakthroughs in terms of energy efficiency, driving range, charging and costs, the 1000kmPLUS project develops a Scalable European Powertrain Technology Platform (SEPtop@SiC), which will define automotive powertrains for EV as commodities. It will use 1200 V SiC-MOSFETs to enable a 400 V/800 V cross-compatible inverter-motor-gearbox combo, scalable as a function of the required performance. Furthermore, ultra-fast charging up to 350 kW for everyday use will be demonstrated in an EV providing an initial driving range of 500 km. The 1000kmPLUS project will enable, demonstrate and set up European mass production capabilities of EV key components by Europe´s leading automotive companies. Further, it will build ECS value chains with focus on quality, safety, efficiency and costs. The 1000kmPLUS project will build up a Mercedes-Benz EQ vehicle to demonstrate the project achievements by performing 3 challenges, representing real use cases.

RESULTS

New architectures, concepts and components to support the advent of the 3rd generation of electrified vehicles.

- A scalable and brand-independent shared automotive powertrain platform supporting a wide power range of 40 kW-120 kW at 400 V-800 V and including advanced motor control algorithms
- New modular power electronic modules for the inverter for cost reduction and scalability

Smart bus systems, electric motors, power electronics enabling smaller form factors, when integrated in batteries and motors and modular approaches, connectivity and systems for enabling automated driving functions.

- Common integration of inverter and motor to reach compactness and lower the costs during mass production
- Modular approach and scalability of the inverter and motor to reduce development /adaption and production costs of the most cost intensive parts in today's EVs
- New modular power electronic modules for the inverter for cost reduction and scalability
- New routing and navigation algorithms to significantly enhance specifically the driving range of electric vehicles

Advances in electric batteries (elementary cells and pack assembly).

- Adaption of an existing electrochemistry to enable 350 kW ultra-fast charging
- Design of a modular 800 V battery pack able to be scaled down to 400 V and providing the thermomechanical structure (including thermal management for ultra-fast charging)

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PROJECT NUMBER	824290		
PROJECT ACCRONYM	**SELFIE**		
PROJECT NAME	SELF-sustained and Smart Battery Thermal Management SolutIon for Battery Electric Vehicles		
START DATE	01/12/2018	**END DATE**	31/05/2022
TOTAL BUDGET (M€)	5 842 546,25	**EU FINANCIAL CONTRIBUTION (M€)**	4 999 455,13
WEBSITE	https://eu-project-selfie.eu/		
COORDINATOR	Joeri VAN MIERLO Joeri.Van.Mierlo@vub.be		

PROJECT PARTNERS

VUB VRIJE UNIVERSITEIT BRUSSEL
Coordinator

Fraunhofer

Valeo

FEV

virtual vehicle

AIT AUSTRIAN INSTITUTE OF TECHNOLOGY

FCA FIAT CHRYSLER AUTOMOBILES | CRF

IK4 IKERLAN Research Alliance

i2m creating business

IMECAR

AIM OF THE PROJECT

The overall objective of SELFIE is to develop and demonstrate a novel self-sustained compact battery system, consisting of:

A smart modular battery pack, which has excellent internal thermal conductivity properties, a refrigerant cooling system and a PCM based thermal storage system (heat buffer) capable of absorbing excess heat due to fast charging, and which is thoroughly insulated from the outside

Specific objectives:

- Development of new/advanced components for battery packs that enable a step change in thermal management, energy efficiency and cost
- Integration, assembly and manufacturing and bench testing of the developed compact battery system
- Demonstration and validation of the battery system

RESULTS

We have recently concluded our 1st year of the project (December 2018 - November 2019). Throughout this year the SELFIE partners focused on the requirements and specifications of the battery thermal management system, as well as on a first preliminary concept design on components and system level.

Here are our main results:

The requirements and specifications at vehicle level have been identified in terms of vehicle performances (max power, max speed, etc.) and driving range, considering the target to remain inside an interval of 60min – 90min more with respect to the driving time of an equivalent vehicle with internal combustion engine for long duration trips of 700-1000 km.
Starting from such vehicle requirements, detailed specifications for the battery system have been defined in terms of volume, weight, energy, charging rate, charging power and lifetime of the pack. The battery cells have been selected after an accurate comparison of different parameters of available cells. The battery pack configuration will be composed of 12 modules, each with 15P3S cells, for a total of 540 cells. The battery cooling system must be designed and incorporate advanced thermal technologies to allow a fast charging at 4C continuous at 35 °C ambient without degrading the cells lifetime.
Finally, a concept and validation plan has been identified, with all the necessary virtual simulations and tests to be performed for components, systems and vehicle.

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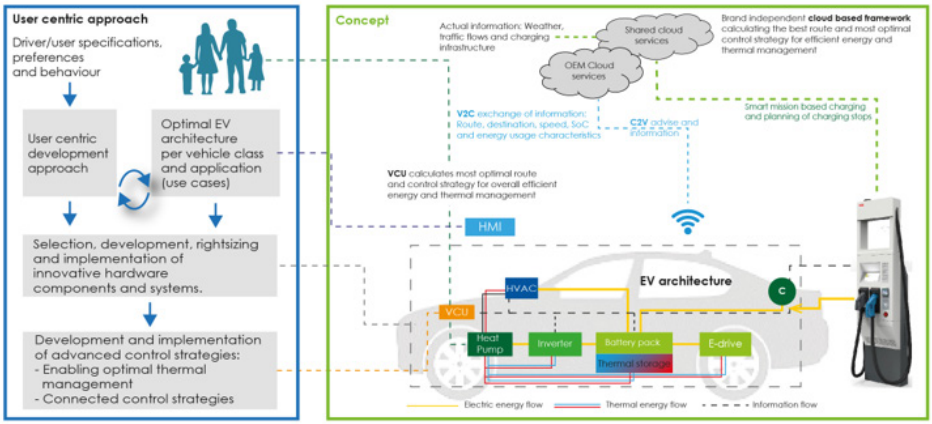
PROJECT NUMBER	824295		
PROJECT ACCRONYM	**CEVOLVER**		
PROJECT NAME	Connected Electric Vehicle Optimized for Life, Value, Efficiency and Range		
START DATE	01/11/2018	**END DATE**	30/04/2022
TOTAL BUDGET (M€)	6 516 847,5	**EU FINANCIAL CONTRIBUTION (M€)**	4 999 700,26
WEBSITE	https://cevolver.eu/		
COORDINATOR	Christophe SCHERNUS schernus@fev.com		

CEVOLVER
Connected Electric Vehicle Optimised for Life, Value, Efficiency and Range

PROJECT PARTNERS

FEV (Coordinator), FCA, CRF, mobi, IFP Energies nouvelles, BOSCH Invented for life, Ford, i2m creating business, UNIRESEARCH, RWTH AACHEN UNIVERSITY

AIM OF THE PROJECT



RESULTS

The CEVOLVER project is a year in its life. Two main results are:

1. Within the CEVOLVER project an important role is played by advanced strategies that operate testing the prototype demonstrators using connectivity as a sources of real time information. The results of the discussions between the partners are available. In short we can say that the advanced features such as optimal thermal management, eco-routing with assured charging functionality, and eco-driving will rely on connectivity to improve, on one hand, the energy consumption (that will impact the vehicle range), and on the other hand, increase user confidence in electric vehicles. A Communication Control Unit (CCU) and a tablet will provide to the demonstration vehicle(s) the ability to connect to a cloud infrastructure or to Vehicle-to-X (V2X) systems. Another conclusion is that the cloud infrastructure is composed of the Original Equipment Manufacturer (OEM) cloud and a brand-independent (BI) cloud that is designed for the project. We can also state that the different connectivity architectures that can be employed by the demonstration vehicles are established.

2. The CEVOLVER scene for a connected energy and thermal management has been set! The connected management functionalities make use of several connectivity features to optimise the route selection, driving behavior, charging stops and charging process. This is made possible due to the cloud-based data and the cloud computing capabilities to perform resource intensive calculations that cannot be otherwise implemented on a Vehicle Control Unit (VCU). An extra benefit of working on this topic is that it has allowed discussing the connectivity limitations and the solutions to support the CEVOLVER features to be developed. The first list of required signals has been formulated and will evolve during the project.

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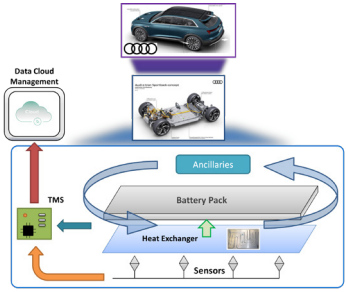
PROJECT NUMBER	824300		
PROJECT ACCRONYM	**i-HeCoBatt**		
PROJECT NAME	Intelligent Heating and Cooling solution for enhanced range EV Battery packs		
START DATE	01/01/2019	**END DATE**	31/12/2021
TOTAL BUDGET (M€)	4 192 705,42	**EU FINANCIAL CONTRIBUTION (M€)**	3 287 012,43
WEBSITE	https://ihecobatt.eu/		
COORDINATOR	Aitor MAKIBAR amakibar@cidetec.es		

PROJECT PARTNERS

cidetec energy storage Coordinator

AIM OF THE PROJECT

The aim of i-HeCoBatt is to achieve a smart, cost bursting, industrial battery heat exchanger to minimize the impact on full electric vehicle range in extreme conditions. Smart, because new sensing functionalities will be embedded to the thermal system in order to monitor the behaviour of the whole BP thermal system. Cost bursting, because expensive components of current SoA products will be replaced by cost efficient components as well as the number of parts minimized. Industrial, because mass production means will be used to manufacture the heat exchanger.



The proposed solution will remove the currently used expensive and heavy gap filler between the heat exchanger and the battery pack (BP) and will replace the interface plate in contact with the BP with an advanced material product. This design enhances the efficiency of the heating and cooling system that will be supported by a heating actuator. Customized printed sensors will be embedded to the heat exchanger to monitor relevant parameters and will feed the battery management control unit as well as an external early diagnostic and safety system connected to the cloud. Different interfaces will be created to access these data according to user profiles: designers, testers, maintenance teams or driver. Finally, the industrialization of the patented innovative heat exchanger concept will contribute to the cost reduction of the heating and cooling system and the EV.

The consortium gathers know-how from a multidisciplinary group of research centres, SME and industrial partners, including an automotive OEM, with expertise in BP and thermal systems design, testing and manufacturing for automotive applications. Partners behind the intelligent heat exchanger concept are European TIERs that intend to position with an unbeatable environmental compliant product that will be introduced in OEMs value chain in a maximum period of 2 years after the closure of the project.

RESULTS

At the time of publication, the following results have been obtained:

- Experimental tests of the battery pack have been carried out to set a reference and to develop models.
- First version of the heat exchanger prototype is modeled, designed and built.
- Fist version of the diagnostic application is developed.

At the end of the project, the following overall results are expected:

- To increase the e-powertrain overall efficiency up to 5%, compared to a state of the art EV, through the implementation of a novel BP heating and cooling system.
- To prove a minimum of 20% cost reduction in mass production of the thermal system by the introduction of an innovative heat exchanger.
- To integrate new components and functionalities leading to higher user friendliness, reduction of range anxiety and temperature impact on degradation of the BP.
- To achieve automotive class quality.
- To demonstrate the developed solutions in several Audi BEV prototypes.

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PROJECT NUMBER	824311		
PROJECT ACCRONYM	**ACHILES**		
PROJECT NAME	Advanced Architectures Chassis/Traction concept for Future Electric vehicles		
START DATE	01/12/2018	**END DATE**	31/05/2022
TOTAL BUDGET (M€)	6 093 473,75	**EU FINANCIAL CONTRIBUTION (M€)**	4 895 704,26
WEBSITE	https://h2020-achiles.eu Twitter: @ACHILES_H2020 and @EVOLVECluster		
COORDINATOR	Omar HEGAZY (VUB) Omar.Hegazy@vub.be		

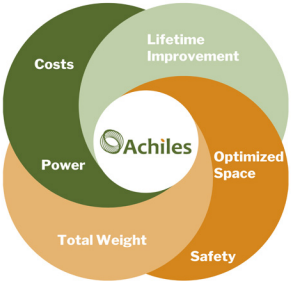
PROJECT PARTNERS

VRIJE UNIVERSITEIT BRUSSEL (Coordinator), Applus IDIADA, ikerlan, Fraunhofer LBF, Continental, tecnalia Inspiring Business, TTTech Ensuring Reliable Networks, elaphe Propulsion Technologies, Audi, TTTechAuto

AIM OF THE PROJECT

ACHILES will develop enhanced parts and functionalities in a new E/E system architecture by developing and further integrating four innovative technological concepts:

1. A new torque vectoring algorithm will significantly improve vehicle dynamics.
2. A new wheel concept design will be equipped with full by-wire braking, including a new friction brake concept.
3. An out of phase control will allow to intentionally operate the electric motor inefficiently to dissipate the excess of braking energy in case of fully charged batteries.
4. A centralized computer platform will host the e-drive functionalities and reduce the number of ECUs and networks while fulfilling the safety & security requirements. It will also support centralized domain controller required to implement high automation and autonomy concepts, a key requirement for smart mobility.



ACHILES is a member of the E-VOLVE cluster.

RESULTS

The full requirements and specifications for the ACHILES Battery Electric Vehicle (BEV) have been defined; focus is given to the powertrain and chassis with support of the brake system by the powertrain. Requirements are based on the Audi Q2 BEV, which will be used as a baseline, with targeted innovations the project will improve them. The test procedures and test list have been defined to verify the requirements.

The overall architecture for this next generation EV has been optimized to include various subsystems, mainly the brake, powertrain and chassis. Subsystems are currently being finalized to allow higher reliability, safety, security and energy efficiency with proper signal interfaces. The models and control strategies adaptations to integrate the four innovative technological concepts have been thoroughly discussed within the consortium and will be delivered shortly.

Finally, important design and development steps have been taken towards the implementation of the new wheel concept and brake system within the chassis and powertrain. The integration phase will then follow with the Audi Q2 BEV being dispatched to the project partners.

NOTES

Horizon 2020
European Union Funding
for Research & Innovation

EGVI
European Green Vehicles Initiative

PROJECT NUMBER	824335		
PROJECT ACCRONYM	**FITGEN**		
PROJECT NAME	Functionally Integrated E-axle Ready for Mass Market Third GENeration Electric Vehicles		
START DATE	01/01/2019	**END DATE**	31/12/2021
TOTAL BUDGET (M€)	5 841 242,5	**EU FINANCIAL CONTRIBUTION (M€)**	4 998 667
WEBSITE	http://www.fitgen-project.eu		
COORDINATOR	Michele DE GENNARO michele.degennaro@ait.ac.at		

PROJECT PARTNERS

AIT AUSTRIAN INSTITUTE OF TECHNOLOGY
Coordinator

BRUSA

tecnalia Inspiring Business

POLITECNICO DI TORINO

FCA FIAT CHRYSLER AUTOMOBILES

CRF

ST

VUB VRIJE UNIVERSITEIT BRUSSEL

AIM OF THE PROJECT

FITGEN aims at developing a functionally integrated e-axle ready for implementation in third generation electric vehicles. It is delivered at TRL and MRL 7 in all its components and demonstrated on an electric vehicle platform designed for the European market (A-segment reference platform). The e-axle is composed of a latest generation Buried-Permanent-Magnet Synchronous Machine, driven by a SiC-inverter and coupled with a high-speed transmission. It is complemented by a DC/DC-converter for high voltage operation of the motor in traction and for enabling superfast charging of the 40kWh battery plus an integrated AC/DC on-board charger. The e-axle also includes a breakthrough cooling system which combines the water motor/inverter circuit with transmission oil. The FITGEN e-axle delivers significant advances over the 2018 State of the Art:

1. 40% increase of the power density of the e-motor;
2. 50% increase of the power density of the inverter, via adoption of SiC-components;
3. affordable super-fast charge capability enabled by the DC/DC-converter, integrated with single- or 3-phase AC/DC-charger;
4. increase of the electric driving range from 740 to 1,050km (including 75 minutes of charging time) in real-world freeway driving with the use of auxiliaries.

The FITGEN e-axle will enter the market in the year 2023, reaching a production volume target of 200,000 units/year by 2025 and of 700,000 units/year by 2030. It is designed to be brand-independent and to fit different segments and configurations of electric vehicles, including hybrids.

RESULTS

With the beginning of 2020, the project has entered in its second year. The WP1 (Architecture of the e-axle) is finished, delivering the end-user specifications, the overall concept and the vehicle integration of the e-axle. In brief, the FITGEN e-axle has been sized to fit 3 vehicle platforms:

1. an A-segment full electric vehicle in 2WD configuration (planned for its demonstration in WP6),
2. a small SUV in plug-in hybrid electric 4WD configuration with the combustion engine on the front axle and the electric traction on the rear axle, and
3. a large SUV full electric vehicle in 4WD configuration with the electric traction on both front and rear axle.

Reference speed profiles, (including WLTP and US06) and real driving cycles have been considered to size the e-axle, leading to the choice of coupling the motor with a single speed transmission with a reduction ratio at 1:12.5. Additionally, the installation space of the e-axle in the demonstrator has been identified, leading to a rear-wheel configuration with the group motor-inverter-transmission-DC/DC hosted in the lower volume of the trunk. At January 2020 (project M13), the SiC inverter design and the DC/DC integration is in progress, while motor design reached its final stage. The active parts of the first motor prototype have already been tested at bench, delivering power and torque performance above FITGEN initial targets. Cooling pipelines, liquid jacket and oil-cooling through motor shaft design is in progress, with earliest results achieved via CFD and adjoint methods.

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Horizon 2020
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European Green Vehicles Initiative

PROJECT NUMBER	824256		
PROJECT ACCRONYM	**PANDA**		
PROJECT NAME	Powerfull Advanced N-Level Digitalization Architecture for models of electrified vehicles and their components		
START DATE	01/12/2018	**END DATE**	30/11/2021
TOTAL BUDGET (M€)	3 488 671,25	**EU FINANCIAL CONTRIBUTION (M€)**	3 488 671,25
WEBSITE	https://project-panda.eu/		
COORDINATOR	Alain BOUSCAYROL alain.bouscayrol@univ-lille.fr		

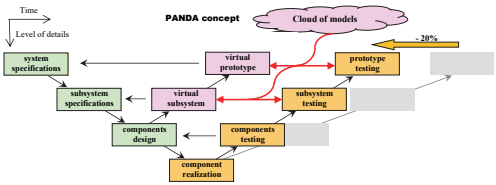
Powerful Advanced N-Level Digital Architecture
for models of electrified vehicles and their components

PROJECT PARTNERS

Université de Lille (Coordinator), SIEMENS, VUB Vrije Universiteit Brussel, Valeo, Technical University of Cluj-Napoca Romania, Typhoon HIL, UBFC Université Bourgogne Franche-Comté, UNIRESEARCH, Groupe Renault, BLUWAYS, TÜV SÜD

AIM OF THE PROJECT

The PANDA project aims to develop a unified organisation of digital models for seamless integration in virtual and real testing of electrified vehicles and their components. It will make development and test of new components and subsystems easier and will enable a reduction of time-to-market by 20%.
The V-model, currently used in industry to develop more efficient products, is rearranged in a W-model to highlight the trend in "virtual homologation".



A cloud of models and a dedicated innovative library will be developed. In addition, stand-alone and cloud computing will be realized first for virtual testing of 3 reference vehicles (a Battery Electric, a Fuel Cell and a Hybrid Vehicle), and second for real testing using "Hardware-In-the-Loop" (HiL) for electrical subsystem of the hybrid electric vehicle.
The main challenges are:

- Interconnection of any model involved in the W-model for seamless integration in the complete simulation of the studied electrified vehicles.
- Development of real-time models of the subsystems for real testing of the different parts of the system.
- Cloud-computing for virtual and real testing toward Industry 4.0

A disruptive simulation method will be developed thanks to the Energetic Macroscopic Representation (EMR) formalism.

RESULTS

After 15 months of work, the organisation rules of the open method and the library of the models of subsystems are available.
The Energetic Macroscopic Representation (EMR) graphical formalism is used as a guideline for a unified organization of models of electrified vehicle and components.
Simcenter AMSim, a 1D simulation platform from physical (structural) libraries with block-diagram (functional) capabilities, was selected to be multi-power platform for Stand-Alone and Cloud-computing. Based on the EMR formalism, the Simcenter AMSim software has been extended by developing a dedicated library. A first BEV has been simulated using the classical structural libraries and the new EMR-library. From the same models, the EMR-based simulation leads to reduce the computation time to 15%.

Expected results:

- Multi-scale models of batteries and e-drive (May 2020)
- Cloud facilities for model sharing and computing (June 2020)
- Virtual testing of the BEV, FCV and P-HEV (May 2021)
- Real testing of the e-subsystems of the P-HEV (June 2021)

NOTES

Horizon 2020
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European Green Vehicles Initiative

PROJECT NUMBER	824306		
PROJECT ACCRONYM	**UPSCALE**		
PROJECT NAME	Upscaling Product development Simulation Capabilities exploiting Artificial inteLligence for Electrified vehicles		
START DATE	01/11/2018	**END DATE**	30/04/2022
TOTAL BUDGET (M€)	3 994 802,5	**EU FINANCIAL CONTRIBUTION (M€)**	3 994 802,5
WEBSITE	https://www.upscaleproject.eu/		
COORDINATOR	Monica PLA monica.pla@idiada.com		

upscale

PROJECT PARTNERS

Applus IDIADA Coordinator
algorithmica technologies
engys
ARTS ET MÉTIERS ParisTech
fi group
FCA
esi get it right®
VUB VRIJE UNIVERSITEIT BRUSSEL
VOLVO
virtual vehicle
CRF
VOLKSWAGEN

AIM OF THE PROJECT

- Enhance the performance of existing CFD and FEM crash test tools and processes using machine learning, thus leveraging the potential of ML/MOR to make primary CAE systems faster and more flexible directly impacting the costs and performance of electric vehicles as they heavily rely on simulation for design.
- Implement AI for aerodynamic design, first the consortium will work on body parametrization and then will create and train an aerodynamics Reduced Order Models capable of computing aerodynamic values.
- Implement AI for crash simulation, which will reduce the simulation run time for a full electric vehicle crash by 30%, including battery packs. The consortium will focus on crash battery modelling by means of ROM.
- CAE process acceleration by means of subrogation of time-consuming solver functions by AI trained algorithms.
- Assessment of a new crash and aerothermal frameworks for full-scale BEV design

EXPECTED RESULTS

- Battery Reduced Order Model (ROM) for crash simulation M-24
- Battery 1D model for thermal simulation M-24
- Aerodynamics Reduced Order Model (ROM) M-36
- ML accelerated CFD solver for aerothermal simulations M-32
- Physics informed turbulence model M-24

NOTES

Horizon 2020
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European Green Vehicles Initiative

PROJECT NUMBER	824314		
PROJECT ACCRONYM	**VISION-xEV**		
PROJECT NAME	Virtual Component and System Integration for Efficient Electrified Vehicle Development		
START DATE	01/01/2019	**END DATE**	31/12/2021
TOTAL BUDGET (M€)	3 995 061,25	**EU FINANCIAL CONTRIBUTION (M€)**	3 995 061,25
WEBSITE	https://vision-xev.eu/		
CONTACT	Reinhard TATSCHL reinhard.tatschl@avl.com		

PROJECT PARTNERS

AVL Coordinator
LAT Laboratory of Applied Thermodynamics Aristotle University Thessaloniki
FPT Powertrain Technologies
Istituto Motori
KTH Vetenskap och Konst
Politecnico Milano 1863
FCA Fiat Chrysler Automobiles
CRF
ZF
Groupe Renault
TU berlin
Univerza v Ljubljani
VUB
mobi Mobility, Logistics & Automotive Technology Research Centre
AVL qpunkt
cmt motores térmicos
Universitat Politècnica de València

AIM OF THE PROJECT

VISION-xEV investigates beyond the state-of-the-art component development and system integration modelling and simulation to facilitate the use of digital product development for all kinds of future electrified powertrain systems and to reduce lab and road testing.

In complex multi-domain products, such as hybrid electric vehicles, developing the different components and sub-systems separately and then connecting them afterwards is not the optimum way to go forward. This is mainly due to the fact, that an extra overall calibration process is needed to harmonize the whole multi-domain system. Additionally, because of the involvement of engineers from different disciplines, issues related to communication and model/data exchange efficiency cannot be avoided. However, powerful computer hardware and related high-performance computing capabilities available today allow to efficiently perform complex computations as well as large series calculations covering thousands of parameter variations. This enables the efficient development and pre-optimization of physics-based virtual prototypes (digital twins) of hybrid electric vehicles on both component and system level. Adopting detailed digital twins of components and sub-systems and integrating them into complex powertrain and vehicle models enables massive frontloading of development activities and hence significantly reduces development time, cost and finally time to market. In this way, a huge percentage of traditional development efforts can be shifted from road, test rigs and laboratories to simulation and virtual testing.

RESULTS

The VISION-xEV project aims at elaborating a versatile simulation framework for next generation electrified/ hybrid vehicle virtual product development and optimization, showing:

- Model prediction accuracy improvements of >30%
- Reduction in model parameterization effort of >35%
- Reduction in model coupling effort > 40%
- Multi-domain xEV modelling and simulation effort reduction of >40%
- Serving as an enabler for massive frontloading of activities to earlier phases in the product development process, leading to an overall xEV development efficiency gain of >25%

The VISION-xEV project results after the first year comprise:

- Methods for assessment and design of real-world driving cycles for electrified vehicles
- Experimentally validated electrical and thermal Lithium-Ion battery / capacitor models and related model-order-reduction and accelerated parameterization workflows
- Detailed 3D and reduced order electro-thermal inverter and e-machine models including joint simulation and experiments based parameterization and validation methodology
- Advanced exergy and power-based models and methods for TC performance assessment under different flow scenarios
- Fast gas-path simulation solver and co-simulation methodology for flexible coupling of engine and aftertreatment simulation tools
- Models of zero flow free convection heat transfer, electrically heated catalysts and phase change material thermal behaviour
- Thermal management models and architecture for hybrid powertrains and vehicles

NOTES

Horizon 2020
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PROJECT NUMBER	824333		
PROJECT ACCRONYM	**XILforEV**		
PROJECT NAME	Connected and Shared X-in-the-loop Environment for Electric Vehicles Development		
START DATE	01/01/2019	**END DATE**	31/12/2021
TOTAL BUDGET (M€)	3 575 078,75	**EU FINANCIAL CONTRIBUTION (M€)**	3 575 078,75
WEBSITE	https://xil.cloud		
COORDINATOR	Valentin IVANOV valentin.ivanov@tu-ilmenau.de		

XILforEV

PROJECT PARTNERS

TECHNISCHE UNIVERSITÄT ILMENAU
Coordinator

elaphe
Propulsion Technologies

Audi
Vorsprung durch Technik

SIEMENS

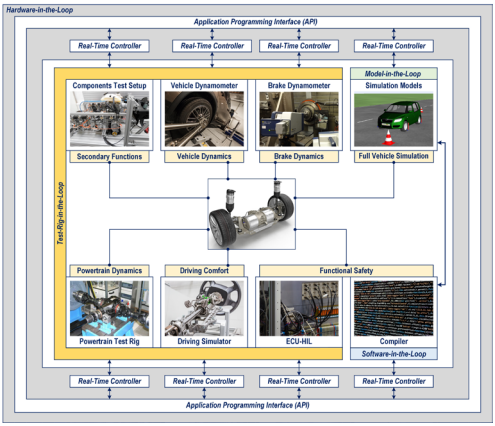
TENNECO

ITAINNOVA

AIM OF THE PROJECT

The **XILforEV project** is proposing a unique approach to the validation and testing of electric vehicles (eEV) and electric vehicle systems with the goal to essentially improve their sustainable production.

To address this problem integrated development and efficient testing of EV, the project is creating for the first time a connected and shared x-in-the-loop experimental environment uniting test platforms and setups from different physical domains and situated in different geographical locations. within XILforEV environment, real-time running of test scenarios simultaneously in all locations allows exploring interdependencies between processes that can be hardly identified or even expected on the design development stage. In the long-term perspective, the plug-in concept of including various test platforms/devices and easy on-demand access to the test programmes for developers, engineers and researchers will bring a vast impact to the EV design community through connecting experimental environments around the world.



RESULTS

The XILforEV project is being established two principal frameworks of connected experimental setups: (i) Distributed local, when the setups are distributed within the narrow location, e.g. within the company site, university campus et al.; (ii) Distributed remote, when the setups are distributed remotely between different geographical locations. The application of both frameworks is being demonstrated in the project for several use cases, highly demanded by designing electric vehicles: development of brake blending and ride blending systems, integrated chassis control as well as fail-safe studies. With the proposed design methodology, the following benefits can be achieved (based on estimation of industrial participants of the consortium):

- The Digital Twin design approach in combination with the shared XILforEV strategy that reduces the development time between 15% and 25% for EV systems. Furthermore, the shared simulation and testing environment will improve the quality through more robust verification, validation and certification of safety-critical EV components;
- A radically new x-in-the-loop solution to end-users as automotive OEMs and suppliers, which will allow substantial accelerating of the development and testing ahead of the EV systems integration and faster modularity assessment, including reduction of R&D material and time costs by developing new electric motors and EV chassis systems;
- A novel service for connected complex test setups and hardware/virtual labs that can be used for specific engineering tasks, which are to be hardly investigated using traditional experimental procedures and real-world tests on full-scale demonstrators;
- An extension of available simulation cloud business models towards real-time domains for designing and validation of cross-domain physical systems.

NOTES

Horizon 2020
European Union Funding
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PROJECT NUMBER	814389		
PROJECT ACCRONYM	**SPIDER**		
PROJECT NAME	Safe and Prelithiated hIgh energy DEnsity batteries based on sulphur Rocksalt and silicon chemistries		
START DATE	01/01/2019	**END DATE**	31/08/2022
TOTAL BUDGET (M€)	7 975 192,5	**EU FINANCIAL CONTRIBUTION (M€)**	7 975 192,5
WEBSITE	https://www.project-spider.eu/		
COORDINATOR	Cedric HAON cedric.haon@cea.fr		

PROJECT PARTNERS

Coordinator

AIM OF THE PROJECT

The SPIDER project proposes a multidisciplinary approach to develop safe and long lifetime, high energy density Li-ion cells. This approach is based on new high capacity materials (sulphur rocksalt cathodes and silicon carbon composites anodes), advanced electrolyte formulations, implementation of selected pre-lithiation process at cell level compatible with industrial requirements and complimented by in-depth characterization, safety, modelling and Life-cycle-analysis studies. SPIDER's advanced, low-cost (75 €/kWh by 2030) battery technology is predicted to bring energy density to ~ 450 Wh/kg by 2030 and power density to 800 W/kg. It operates at a lower, and thus safer, voltage, which enables the use of novel, intrinsically safe liquid electrolytes. Safety concerns will be further eliminated (or strongly reduced), and thermal runaway temperature increased to over 200°C. Moreover, thanks to the prelithiation, SPIDER overcomes one of the main Li-ion ageing mechanisms for silicon based anodes: notably, the loss of cyclable lithium, which should increase lifetime to 2000 cycles by 2022. In addition, SPIDER's classic cell manufacturing process with liquid electrolyte will be readily transferable to industry, unlike solid electrolyte designs, which still require the development of complex manufacturing processes. SPIDER batteries will be designed to be 60% recyclable by weight, and a dedicated recycling process will be developed and evaluated. Finally, the SPIDER project will contribute to help electric vehicles to rapidly gain market share and reduce CO2 emissions.

EXPECTED RESULTS

SPIDER technologies are implemented on 4 consecutive advanced Li-ion cell generations in which the presented concepts will be successively introduced to get better understanding of Li-ion battery cost, performance, recyclability and safety. Generation 0 cells will be delivered during the second quarter of 2020 and will provide a performance baseline for NMC811 / silicon – carbon composite materials combined with a reference electrolyte formulation. During the first year, a benchmark of the state-of-the-art materials has been done in small Li-ion pouch cells by comparing NMC622 vs NMC811 and graphite vs silicon – carbon composite. Regarding the energy density, by replacing NMC622 with NMC811 an increase in specific energy density of >10% can be achieved (with graphite) and the capacity retention is similar with 95% after 300 cycles. In addition, by replacing graphite with silicon composite an initial increase in specific energy density of ~14% can be achieved. In the future, the project aims at achieving the performances below:

Key Performance Indicator at cell level	baseline (NMC622/Graphite)	SPIDER technology 2022
Energy density (Wh/kg)	240	390
Power density (W/kg)	700	800
Durability (number of cycles)	500 - 1000	Up to 2000
Cost (€/KWh)	180	90
Safety (Thermal energy dissipation (kW/kg)	20	4
Recyclability (recycling efficiency in %)	55	60
Sustainability (dependence on Critical Raw Materials)	Cobalt, Nickel	Absence of Cobalt and Nickel

NOTES

Horizon 2020
European Union Funding
for Research & Innovation

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European Green Vehicles Initiative

PROJECT NUMBER	814464		
PROJECT ACCRONYM	**Si-DRIVE**		
PROJECT NAME	Silicon Alloying Anodes for High Energy Density Batteries comprising Lithium Rich Cathodes and Safe Ionic Liquid based Electrolytes for Enhanced High VoltagE Performance.		
START DATE	01/01/2019	**END DATE**	31/01/2023
TOTAL BUDGET (M€)	7 999 492,5	**EU FINANCIAL CONTRIBUTION (M€)**	7 999 492,5
WEBSITE	http://sidrive2020.eu/		
COORDINATOR	Kevin RYAN kevin.m.ryan@ul.ie - sidrive@ul.ie		

Si·DRIVE

PROJECT PARTNERS

University of Limerick – Coordinator; ENEA; Empa – Materials Science and Technology; CRF Centro Ricerche Fiat; DLR; KIT – Karlsruher Institut für Technologie; Katholieke Universiteit Leuven; Solvionic; RWTH Aachen University; gemmate technologies; cidetec energy storage; LITHOPS Batteries; ZSW; Politecnico di Torino; SMIT Thermal Solutions

AIM OF THE PROJECT

Si-DRIVE will develop the next generation of rechargeable Li-ion batteries, allowing for cost competitive mass market EVs by transformative materials and cell chemistry innovations, delivering enhanced safety with superior energy density, cycle life and fast charging capability using sustainable and recyclable components. The technology encompasses amorphous Si coated onto a conductive copper silicide network as the anode with polymer/ionic liquid electrolytes and Li-rich high voltage (Co-free) cathodes via processes that are scalable and demonstrably manufacturable within Europe. Comprehensive theoretical and experimental studies will probe and control interfacial processes that have heretofore limited Li-ion technologies to incremental gains, guiding materials design and eliminating capacity fade mechanisms. The Si-DRIVE technology will exceed the stringent demands of EV batteries where safety is paramount, by dramatically improving each component within the accepted Li-ion platform and achieving this in a market competitive process with whole of life considerations. The technology will also demonstrate suitability for 2nd life applications at reduced energy density beyond the primary EV lifetime, prior to cost effective materials recycling, consistent with a circular economy. The Si-DRIVE consortium boasts the required academic and industrial partner expertise to deliver this technology and spans material design and synthesis, electrochemical testing, prototype formation and production method validation, life cycle assessment and recycling process development.

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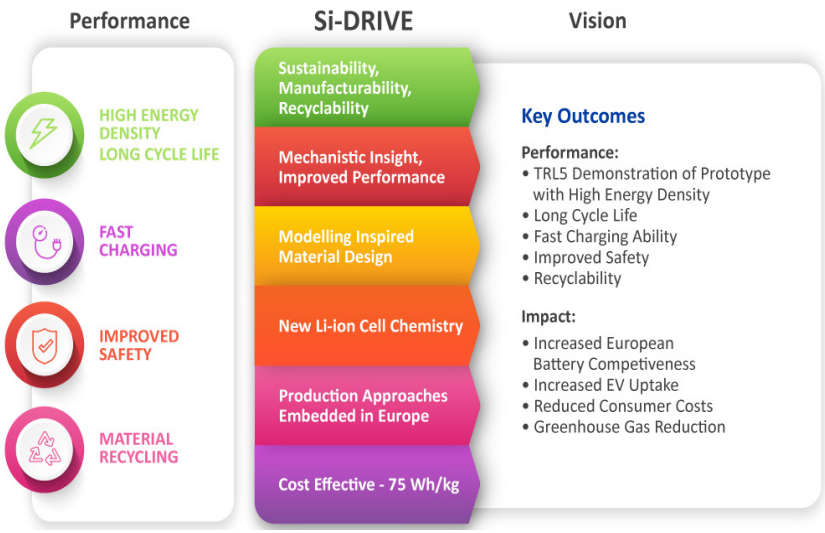
Topic LC-NMBP-30-2018

EXPECTED RESULTS



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Horizon 2020
European Union Funding
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European Green Vehicles Initiative

PROJECT NUMBER	814471		
PROJECT ACCRONYM	**LISA**		
PROJECT NAME	Lithium sulphur for SAfe road electrification		
START DATE	01/01/2019	**END DATE**	31/07/2022
TOTAL BUDGET (M€)	7 920 587,5	**EU FINANCIAL CONTRIBUTION (M€)**	7 920 587,5
WEBSITE	https://www.lisaproject.eu/		
COORDINATOR	Luis MIGUEL DOS SANTOS lmartins@leitat.org		

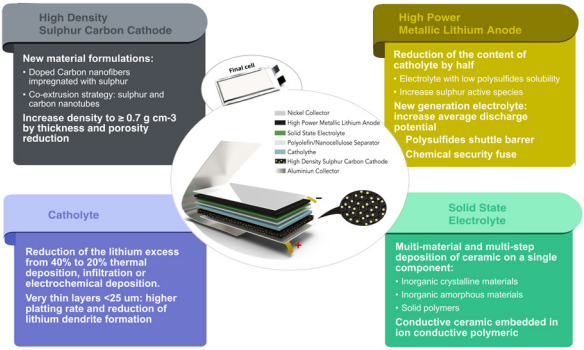
PROJECT PARTNERS

LEITAT managing technologies — Coordinator
ACCUREC RECYCLING GMBH
ARKEMA INNOVATIVE CHEMISTRY
CIC energigune energy storage research centre
Cranfield University
Fraunhofer IWS
oxis ENERGY Next Generation Battery Technology
GROUPE RENAULT
VARTA
optimat
PULSEDEON
VDL
TECHNISCHE UNIVERSITÄT DRESDEN

AIM OF THE PROJECT

LISA is focused on optimising li-s components and cells through new and significantly improved materials and innovative processes. This project directly builds on the results of the ALISE project, in which more than hundred pouch cells have been produced, and the first 2 kWh PHEV lis battery module has been delivered. Nevertheless, there were key bottlenecks encountered during the project such as the safety, the volumetric energy density, the power rate and the cycle life.

LISA proposes the development of high energy and safe lis battery solving the problems of the cells developed in ALISE. The sustainability of the technology will be assessed from an environmental and economic perspective



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Topic LC-NMBP-30-2018

EXPECTED RESULTS

The cell aims to be validated at 20Ah according to EUCAR industrial standards.

LISA will solve specific lithium sulphur bottlenecks such as the metallic lithium protection, the power rate, and the volumetric energy density.

A target has also been set for production cost, as it is the main selection criteria for EV batteries.
The outcome of the project in terms of new materials, components, cells, and manufacturability will be transferable to other lithium-anode based technologies such as Li-ion and solid-state lithium technologies.

LISA will have a large impact on existing and next-generation EV batteries, delivering technology with higher energy density beyond the theoretical capacities of chemistries using CRM – i.e. natural graphite and cobalt - or silicon-based chemistries inherently limited by their manufacturability.

The sustainability of the technology will be assessed from an environmental and economic perspective. Recycling safety, recycling cost and commercial product optimization should be all considered in order to implement a sustainability, and cost-efficient recycling process.

NOTES

Horizon 2020
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European Green Vehicles Initiative

PROJECT NUMBER	875187		
PROJECT ACCRONYM	**USER-CHI**		
PROJECT NAME	Innovative solutions for USER centric CHarging Infrastructure		
START DATE	01/02/2020	**END DATE**	31/01/2024
TOTAL BUDGET (M€)	17 486 866,25	**EU FINANCIAL CONTRIBUTION (M€)**	14 263 188,38
WEBSITE	https://www.userchi.eu/		
COORDINATOR	Antonio MARQUÉS amarques.etraid@grupoetra.com		

PROJECT PARTNERS

Coordinator

AIM OF THE PROJECT

USER-CHI aims at unlocking the massive potential of electromobility in Europe. This will be achieved by (1) integrating different innovative charging technologies with a holistic perspective, (2) putting the users at the centre and empowering them, (3) exploiting the synergies between electromobility and green and smart grids, (4) integrating the technological tools, business models and regulatory measures to improve the experience of electric vehicle (EV) drivers while making it financially attractive for the relevant private and public actors to deploy large scale European user-centric charging infrastructure.

USER-CHI is an industry powered, city driven and user-centric project which will build and demonstrate its results in five urban areas all along the European territory: Barcelona (Spain), Rome (Italy), Berlin (Germany), Budapest (Hungary), and Turku (Finland). Since large scale replication and transferability of USER-CHI results is one of the cornerstones of the project, two replication cities have been included: Murcia (Spain) and Florence (Italy). These seven urban areas are urban nodes of the key Mediterranean and Scandinavian-Mediterranean TEN-T corridors, while their different sizes, complementary contexts and e-mobility maturity level offer a representative sample of e-mobility in Europe, facilitating the scalability and replicability of the demonstrated solutions.

The seven USER-CHI demo and replication sites will involve more than 27,000 EVs and 1,800 Electric Vehicle Supply Equipment (EVSEs).

EXPECTED RESULTS

USER-CHI will develop integrated approaches, smart solutions and innovative technologies - referred to as 'specific cases' - that will be demonstrated in the five demonstration cities as of July 2022. Moreover, USER-CHI will develop eight products that will be designed and developed to support technical performance within the project, and the sustainability and market transferability after the project completion. Those are:

- CLICK – Charging Location and Holistic Planning Kit (July 2022);
- 'Station of the Future' Handbook;
- eMoBest – e-Mobility Replication and Best Practices Cluster (continuous);
- INFRA – Interoperability Framework (April 2021);
- INCAR – Interoperability, Charging and Parking Platform (January 2022);
- SMAC – Smart Charging Tool (March 2022);
- INSOC – Integrated Solar-DC Charging for Light Electric Vehicles (April 2022);
- INDUCAR – Inductive Charging for EVs (April 2022) .

USER-CHI expects to directly increase the number of EVs by 8,000, the number of EVSE by 400, users' satisfaction levels by 70%, citizens' acceptance level by 50% and reduce GHG emissions by 450,000 tons per year in the demonstration cities. In addition, indirect impacts of USER-CHI are estimated in 224,000 new EVs, 11,200 new EVSEs and a reduction of 12,600,000 tons CO2/year.

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Horizon 2020
European Union Funding
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EGVI
European Green Vehicles Initiative

PROJECT NUMBER	875683		
PROJECT ACCRONYM	**INCIT-EV**		
PROJECT NAME	Large demonstratIoN of user CentrIc urban and long-range charging solutions to boosT an engaging deployment of Electric Vehicles in Europe		
START DATE	01/01/2020	**END DATE**	31/12/2023
TOTAL BUDGET (M€)	18 630 765,24	**EU FINANCIAL CONTRIBUTION (M€)**	14 999 390,52
WEBSITE	https://www.incit-ev.eu/		
COORDINATOR	Xavier SERRIER xavier.serrier@renault.com		

PROJECT PARTNERS

AIM OF THE PROJECT

INCIT-EV aims to demonstrate an innovative set of charging infrastructures, technologies and its associated business models, ready to improve the EV users experience beyond early adopters, thus, fostering the EV market share in the EU. The project will seek the emergence of EV users' unconscious preferences relying on latest neuroscience techniques to adapt the technological developments to the users' subjective expectations. 5 demo environments at urban, peri-urban and extra-urban conditions will be ready for the deployment of 7 use cases, addressing:

1. Smart and bi-directional charging optimized at different aggregation levels
2. Dynamic wireless charging lane in an urban area
3. Dynamic wireless charging for long distance (e-road prototype for TEN-T corridors)
4. Charging Hub in a carpark facility
5. Superfast charging systems for EU corridors
6. Low power DC bidirectional charging infrastructure for EVs, including two-wheelers
7. Opportunity wireless charging for taxi queue lanes in airports & central stations

These use cases pursue innovations in the current charging solutions as well as their seamless integration into the existing transport, grid, ICT and civil infrastructures. For this purpose, the INCIT-EV Platform will be developed comprising a DSS and a set of APPs addressing the users and e-mobility stakeholders' needs.

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Topic LC-GV-03-2019

EXPECTED RESULTS

INCIT-EV approach will target all type of EV end-users, deploying technological solutions to cover most of the needs of end users, including commuters [UC4, UC6], fleet operators such as Taxis/TNCs [UC2,UC7] long-range drivers [UC3, UC5], car sharing and mobility services users [UC1, UC4, UC6] and private parking users [UC1]. INCIT-EV will directly engage 3,475 private EV drivers along these use cases for the dissemination and testing of the charging solutions and the enhanced driving experience deployed in the project, as well as 10 local communities, 4 Taxis cooperatives/associations, 4 car sharing and 4 LEVs sharing companies with the goal to improve their perception about electromobility. To this end, INCIT-EV solutions will be designed to cover 80% of the user needs and requirements as gathered in the surveys. Furthermore, the areas involved in INCIT-EV gather an overall population over 20 M people, and over 10.3M registered private vehicles (of which 104,269 are EVs).

NOTES

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PROJECT NUMBER	875131		
PROJECT ACCRONYM	**eCharge4Drivers**		
PROJECT NAME	Electric Vehicle Charging Infrastructure for improved User Experience		
START DATE	01/06/2020	**END DATE**	31/05/2024
TOTAL BUDGET (M€)	18.405.861,2	**EU FINANCIAL CONTRIBUTION (M€)**	14.424.526,39
WEBSITE	https://echarge4drivers.eu/		
COORDINATOR	Institute of Communication and Computer Systems (ICCS) info-isense@iccs.gr		

PROJECT PARTNERS

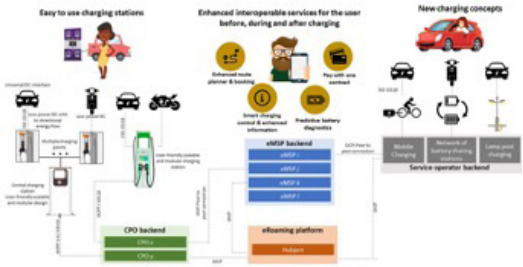
Coordinator

AIM OF THE PROJECT

The vision of eCharge4Drivers is to focus on the users and substantially improve the EV charging experience within cities and on long trips, making it better than refuelling an ICE vehicle. The objectives are:

- Develop and demonstrate user-friendly charging stations and smart charging solutions for passenger vehicles and LEVs
- Enable and demonstrate the interoperability of end-to-end communication (vehicle-to-charging station, charging station-to-back-end and back-end-to-user) by implementing the ISO 15118 Plug & Charge feature and Open Charge Point Protocol (OCPP) in its charging stations and the back-offices of all service providers in the consortium, additionally enabling the provision of enhanced information to the EV users, before, during and after a charging session
- Maximise benefits (i.e. reduce costs) for the users by designing and demonstrating innovative efficient charging stations and charging components, smart power management modules and smart charging strategies, that will additionally enable the more efficient integration of EVs in the electricity network
- Deploy and demonstrate innovative charging solutions for on-street residential charging for passenger vehicles, including a mobile charging service and charging points on lamp posts, and standardised battery swapping stations for LEVs
- Accelerate the deployment of charging infrastructure and other charging services in a sustainable and user-centric way.

EXPECTED RESULTS



EV Charging Location Planning Tool, Recommendations and Guidelines

The work will start with wide surveys in 10 demonstration areas, to capture the a priori users' perceptions and expectations as regards the various charging options and their mobility and parking habits. Based on the survey findings and after matching with the perspective of authorities, operators and service providers, the project will develop and demonstrate in 10 areas, including metropolitan areas and TEN T corridors, easy-to-use, scalable and modular, high- and low-power charging stations, low-power DC charging stations and components with improved connection efficiency and standardised stations for LEVs. The project will demonstrate additional convenient charging options within cities, a mobile charging service, charge points at lamp posts and networks of battery swapping stations for LEVs. Using the knowledge generated, the project will propose an EV Charging Location Planning Tool to determine the optimum mix of charging options to cover the user needs, recommendations for legal and regulatory harmonization and guidelines for investors and authorities for the sustainability of charging infrastructure and services.
The project results will support the deployment of user-centric charging infrastructure and the market uptake of EVs.

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PROJECT NUMBER	874972		
PROJECT ACCRONYM	**LONGRUN**		
PROJECT NAME	Development of efficient and environmental friendly LONG distance powertrain for heavy dUty trucks aNd coaches		
START DATE	01/01/2020	**END DATE**	30/06/2023
TOTAL BUDGET (M€)	32 987 488,9	**EU FINANCIAL CONTRIBUTION (M€)**	24 986 680
WEBSITE	https://www.h2020-longrun.eu/		
COORDINATOR	Lukas VIRNICH virnich@fev.com		

PROJECT PARTNERS

FEV Coordinator · DAF A PACCAR COMPANY · FPT POWERTRAIN TECHNOLOGIES · FORD OTOSAN · Irizar · IVECO · AVL · VDL BUS & COACH · VOLVO VOLVO GROUP · IFP Energies nouvelles · ABEE AVESTA BATTERY & ENERGY ENGINEERING · Shell · EATON Powering Business Worldwide · Garrett · Applus IDIADA · PrimaFrio · SIEMENS Ingenuity for life · umicore · NESTE · TOTAL · TU/e Technische Universiteit Eindhoven University of Technology · TU Graz · UNIRESEARCH · tecnalia Corporación Tecnológica · European Commission · CHALMERS UNIVERSITY OF TECHNOLOGY · Mechatronic Systems for Combustion Engines · RWTH AACHEN UNIVERSITY · VUB VRIJE UNIVERSITEIT BRUSSEL · UNIVERSITÀ DEGLI STUDI DELL'AQUILA

AIM OF THE PROJECT

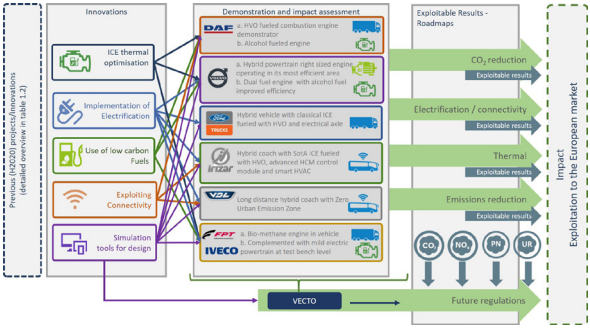
The overall objective of the project is to implement innovative solutions into demonstrator vehicles, powertrains and engines, and to demonstrate and assess them within specific use cases.

Objective 1: To achieve over 10% energy saving (tank to wheel (TtW)), excluding effects of plug-in hybrids) and correspondent CO2 reduction.

Objective 2: Realisation of robust ICE engine technology for use of future fuels (HVO, dual fuel mixtures), to achieve a major (>90%) CO2 reduction well to wheel through.

Objective 3: To achieve an internal combustion engine performance which reaches a 50% target in terms of peak thermal efficiency.

Objective 4: Aftertreatment systems integrated into hybrid powertrains with advanced engines.



Objective 5: To achieve a multiscale backward/forward simulation framework to support the design and development of efficient powertrains, including hybrids.

Objective 6: To demonstrate the optimal combination of technologies by validation on engine test rigs/ test track/ on road with the realisation of demonstrator engine, drivelines and vehicles with the key innovations implemented.

EXPECTED RESULTS

- LONGRUN will implement innovative solutions into demonstrator vehicles, powertrains and engines, and to demonstrate and assess them within specific use cases. LONGRUN will contribute to lower the impacts with 10% energy saving (TtW) and related CO2, 30% lower emission exhaust (NOx, CO and others), and 50% Peak Thermal Efficiency.
- A second achievement will be the multiscale simulation framework to support the design and development of efficient powertrains, including hybrids for both trucks and coaches. With the proposed initiatives a leading position in hybrid powertrain technology and Internal Combustion Engine operating on renewable fuels in Europe will be guaranteed. A single solution is not enough to achieve these targets.
- The LONGRUN project brings together leading OEMs of trucks and coaches and their suppliers and research partners to publish major roadmaps for technology and fuels in time for the revision of the CO2 emission standards for heavy duty vehicles in 2022 to support decision making with most recent and validated results and to make recommendations for future policies.

NOTES

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PROJECT NUMBER	875041		
PROJECT ACRONYM	**SOLUTIONSplus**		
PROJECT NAME	Integrating Urban Electric Mobility Solution in the Context of the Paris Agreement the Sustainable Development Goals and the New Urban Agenda		
START DATE	01/01/2020	**END DATE**	31/12/2023
TOTAL BUDGET (M€)	20 305 278,75	**EU FINANCIAL CONTRIBUTION (M€)**	17 996 079,75
WEBSITE	http://www.solutionsplus.eu		
COORDINATOR	Oliver LAH Oliver.lah@uemi.net		

PROJECT PARTNERS

Coordinator

AIM OF THE PROJECT

SOLUTIONSplus is an international flagship project to support the global transition to sustainable mobility. In the context of the EU-funded SOLUTIONSplus project 45 partners and over 100 associated partners work together on transformative change towards sustainable urban mobility through innovative and integrated electric mobility solutions. The team of local authorities, knowledge and finance partners, industry, networks and international organizations will help boosting the availability of public and shared electric vehicles, foster the efficiency of operations and support the integration of different types of e-mobility in urban areas that meet the needs users and local conditions in Europe, Asia, Africa and Latin America. The project will implement e-mobility solutions for the first and last mile (electric two and three-wheelers), electric buses and minibuses, innovative charging solutions and multimodal journey planners in the partner cities. The project brings together some of the leading networks, industry actors, knowledge and implementation organisations and highly motivated cities to test innovative e-mobility solutions that can help addressing these challenges. The consortium will develop, test and replicate innovative, intermodal e-mobility solutions to address the increased demand for personal and freight transport and the related challenges. The focus for the project will be on shaping energy use, providing access for all, creating business opportunities and developing concepts that can make a direct contribution to a low-carbon development through e-mobility. The emphasis on shared and public transport fleets of the project will also help address, among other things, urban congestion, access to jobs and services, and influence land use. A core element of the implementation concepts to be developed will be an integrated and balanced approach that addresses social, economic and environmental issues.

EXPECTED RESULTS

The project will work on the adaptation and integration of different solutions three key areas of urban mobility:

- **Vehicles:** The demonstration actions support the introduction and integration of electric buses, mini-buses, taxis, 2- and 3-wheelers in partner cities. The key focus for the international cooperation aspects will be on the collaboration between European industries and local companies, with a particular focus on last-mile connectivity. but also testing the viability of e-logistics options.
- **Operation:** The demonstration actions will also focus on e-mobility operations, including conventional and wireless, innovative charging solutions for different types of vehicles. The key focus for the international cooperation aspects will be on the provision and adaptation of innovative European charging solutions for different use-cases in the partner cities.
- **Integration:** The demonstration actions will foster intermodal route planning, eco-routing, ticketing, trip planning, navigation, demand-responsive service and dispatching and will provide a white-label app for the adaptation to the local contexts.

The project encompasses city level demonstrations to test different types of innovative and integrated e-mobility solutions, complemented by a comprehensive toolbox, capacity development and replication activities. Demonstration actions will be launched in Hanoi (Vietnam), Pasig (Philippines), Lalitpur/Kathmandu (Nepal), Nanjing (China), Kigali (Rwanda), Dar es Salaam (Tanzania), Quito (Ecuador), Montevideo (Uruguay), Madrid (Spain) and Hamburg (Germany) and replicated in 20 additional cities.

NOTES

Disclaimer : All the information provided in this booklet has been submitted on a volontary basis by the projects' coordinators, reflecting their progress at the date of publication

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