

E-VOLVE EV FOR LIFE, VALUE, EFFICIENCY



NEWSLETTER 06/23

Here is the next edition of our E-VOLVE Cluster newsletter! This issue wants to honor success stories of two of our partner projects. EVC1000 will introduce the most mentionable outcomes of their research and SYS2WHEEL will offer some insights on their developments towards sustainable city logistics and improving mobility, accessibility, and quality of life of European citizens. Be sure to check out the two project videos which give you a very good overview of the projects as well.

Let's celebrate the great developments that have happened in these projects. We hope you enjoy this issue!

SUCCESS STORIES

EVC1000

Electric Vehicle Components for 1000km daily trips



Duration: 01.01.2019 – 31.12.2022

Coordinator: AVL List GmbH

Consortium: 10 Partners from 6 countries

The EVC1000 consortium worked on innovative and mass-production optimised components enabling the efficient integration of powertrain and chassis systems to ultimately increase Electric Vehicles (EV) range and user acceptance. The project's work will support the eventual mass production of highly efficient EVs and boost Europe's competitiveness.

The consortium successfully prototyped and evaluated new components, of which some have since been patented:

- **New components for in-wheel powertrains:**
 - i) Efficient, scalable, reliable, low-cost and production-ready in-wheel motors suitable for a wide range of torque and power levels;
 - and ii) Compact centralised drive for in-

wheel motor axles, based on Silicon Carbide technology, targeting superior levels of functional integration and failsafe operation – so called, eWD2. The designs consider electro-magnetic compatibility aspects and include prognostics and health monitoring techniques of the electronic components.

- **New components for electrified chassis control with in-wheel motors:** i) Brake-by-wire system, consisting of front electro-hydraulic brakes and rear electro-mechanical brakes for seamless brake blending, high regeneration capability and enhanced anti-lock braking system performance; and ii) Electro-magnetic and electro-pneumatic suspension actuators, targeting increased comfort and EV efficiency, e.g. through the optimal control of the ride height depending on the driving conditions.
- **Controllers for the novel EVC1000 components and new functionalities,** exploiting the benefits of functional integration, vehicle connectivity and driving automation for advanced energy management, based on the results of previous projects and initiatives.

EVC1000 not only developed innovative components which are now on the path to

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industrialisation and are expected to reach the market around 2024-2025. Follow-up programmes including training and expert exchange in the framework of the E-VOLVE Cluster have been established to create an innovation ecosystem to drive cutting-edge EV technology in Europe.

Find more about the project:

CORDIS
EU research results



Deliverables



Publications

Project Video:



Follow the project:



SYS2WHEEL

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



Duration: 01.01.2019 – 31.09.2022

Coordinator: Virtual Vehicle Research GmbH

Consortium: 12 Partners from 8 countries

Developing sustainable city logistics and improving mobility, accessibility, and quality of life of European citizens by taking a transdisciplinary approach was the main goal of the SYS2WHEEL project.

SYS2WHEEL developed components and systems for a range of commercial battery electric vehicles (cBEVs), and extensions to passenger vehicles and busses. Essential enabling elements in the project are e-motors for both in-wheel and e-axle systems, a novel suspension for in-wheel systems, the in-wheel and e-axle systems themselves, time-sensitive networking, advanced controls, affordable and efficient processes, and scalability and transferability of innovations.

The SYS2WHEEL Project targeted the development of cost efficient, scalable electric drivetrains for commercial vehicles (N1 and N2). The project developments have been demonstrated on two vehicles addressing different market requirements, drivetrain architectures, and software technologies:

- N1: FIAT Doblo for the in-wheel system demonstrator
- N2: IVECO Daily for the e-axle System



Figure 1: N1 category vehicle on the test track: Fiat Doblo with in-wheel technology and increased space for cargo or battery in the rear by close-to-wheel suspension ([source](#))

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Figure 2: N2 Category vehicle IVECO Daily with fully modular e-axle on roller test bench for evaluation ([source](#))

By using these vehicles, the consortium was able to demonstrate the scalability, transferability and benefits of the SYS2Wheel solutions in a representative environment.

Main results of SYS2Wheel:

At component and system level, a cost reduction of more than 20% was achieved for N1 and N2 demonstrators; a 50% cost reduction was achieved by eliminating components in the design; for the e-motors a 12% reduction was achieved, and 35% cost reduction was assigned to rare earth material reduction. For the N1 category demonstrator, a cost reduction of 80% is attributed to the application of TSN for communication (this does not apply for the N2 demonstrator, as TSN was not implemented there).

Concerning efficiency: Some efficiency targets could not be met 100%. The reason for this is that there was too little time available for calibration loops on system level, that are common practice in the automotive industry.

The in-wheel system together with the close 2-wheel suspension offers logistics companies increased space for cargo.

The e-axle system developed for the N2 category vehicle helps to reduce production costs by eliminating some components in the powertrain.

The energy harvesting device from Hiwitronics can be effectively used to continuously supply sensors in the wheel with power, which is useful when high data rates are needed, and a battery located in the wheel would have to be replaced too often.

The time sensitive network from TTTech is already on the market.

At its final public event, the consortium presented the overall achievements of the project and prepared four webinars. The webinars are available on the project website.

Find more about the project:

CORDIS
EU research results

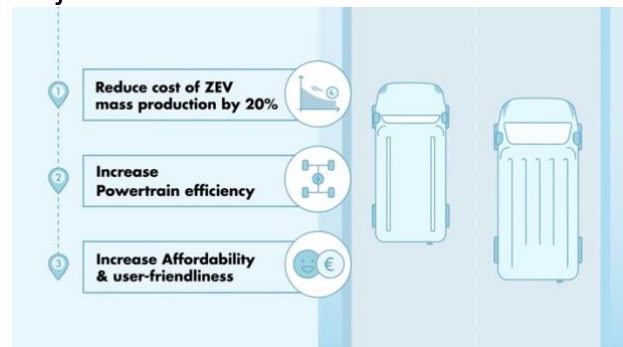


Final Event



Publications

Project Video:



Follow the project:



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COMING UP



HighScape project meeting in Guildford, UK
June 13th-14th 2023



EM-TECH project meeting in Guildford, UK
June 14th-15th 2023



HiPE General Assembly Meeting in Turin, Italy
June 20th-21st 2023



SELFIE Final Event Online
(more info [here](#))
July 5th July, 09:00 – 12:30 CET



SCAPE Workshop in Modena, Italy
July



TRA – 10th Conference in Dublin
April 15th-18th 2024

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