

EU-LIVE Efficient Urban Light VEHicles

Project Overview

Future urban mobility calls for more space for people and less space for cars as well as for environmentally compatible vehicle concepts, saving resources and minimizing local noise and air pollutant emissions. Motor vehicles in the L-category¹ already offer an interesting complementary solution to public transport, walking and cycling. Yet, at present, L-category vehicles are still not sufficiently attractive to end users due to their relatively high prices.

EU-LIVE - "Efficient Urban Light VEHicles", a European R&D project funded by Horizon 2020, will provide a comprehensive solution, which covers a wide range of L-category vehicles: A comprehensive platform for the next generation of electrified, cost- and energy-efficient light urban vehicles. It enables economies of scale by providing modular powertrains as well as bodies and an integrated modular co-simulation platform. Thus, EU-LIVE will enhance the competitive position of the export-oriented European vehicle industry and make an important contribution to a sustainable future mobility system.

The EU-LIVE project is carried out by an international consortium with comprehensive expertise in the areas related to vehicle research and development. It consists of major European manufacturers of passenger cars and L-category vehicles, Tier 1 suppliers of components and sub-systems, SMEs and research centres specialised in mobility and the automotive sector. The know-how of this interdisciplinary think-tank ensures sustainable market exploitation of the project results.

Vision and Challenges

Increasing urbanisation requires significant changes with respect to living and mobility. The quality of our cities is increasingly characterized by low emission zones, pedestrian areas and cycling lanes. Thus, the need for sustainable, resource-saving and environmentally compatible mobility concepts is rising.

Together with public transport, the soft modes of mobility such as walking and cycling will remain the backbone of future urban mobility systems. These modes have limits regarding individual comfort, speed and transport capacity. Nevertheless, users still demand their privacy and individuality, which public transport cannot offer in full.

At the same time urban transportation is becoming more and more multimodal. User behaviour is shifting from owning to using. Nowadays new mobility services such as sharing or pooling enrich

¹ L-category vehicles comprise powered vehicles such as scooters, 3-wheelers and light 4-wheelers, weighing less than 450 kg. http://ec.europa.eu/transport/road_safety/topics/vehicles/vehicle_categories/index_en.htm

European city centres. However, most of these systems are still based on conventional vehicle types, for example fossil fuel powered cars.

To tackle these future challenges of mobility in a comprehensive way, novel types of vehicles have to be developed. There is a growing demand for cost-efficient, clean, quiet, easy-to-park and easy-to-manoeuve urban vehicles that enable a broad spectrum of users to freely, comfortably and affordably move around in highly populated areas. Electrified L-category vehicles – powered two-, three- and ultra-light four wheelers – are potentially ideal solutions to fulfil this demand. Their compact size enables enhanced agility in congested areas and facilitates finding a parking space. GHG emissions of these vehicles are significantly lower or even zero for fully electric models (also concerning noise). In this way they offer a complementary solution to public transport and to the “soft” modes, in particular if equipped with electrified powertrains for minimised local noise and air pollutant emissions.

So far the European L-category vehicle industry has faced relatively high component and subsystem costs because of only low-to-medium sales volumes per vehicle model and a lack of modular (carryover) strategies – as opposed to high-volume passenger car industry. This situation keeps customer prices high and makes L-category vehicles less attractive to end users. Furthermore, due to the lack of cooperation, development methods and tools available in the 2-wheeler industry are often limited and less advanced than in the high-volume car industry.

The vision of EU LIVE consists of

- > improving the efficiency in designing and developing L-category vehicles, thus reducing development times & times-to-market by 15–20%
- > providing a set of energy-efficient and cost-efficient electric and plug-in hybrid powertrain components suitable for L-category vehicles
- > demonstrating highly innovative vehicle architectures specifically designed for electrified powertrains
- > reducing total energy consumption (fuel and electricity) and GHG emissions by 70% for L5e PHEVs (compared to conventional three-wheelers)
- > demonstrating real driving emissions below Euro 5 level for L5e PHEVs
- > providing a clear road to market for a comprehensive range of L-category vehicles

Strategy

The underlying idea of EU-LIVE is to develop and to apply a systematic European approach for efficiently designing, developing and building a wide range of electrified L-category vehicles: the so called “**EU-LIVE Modular Platform**”. For this, EU-LIVE will use a comprehensive modular strategy regarding both real L-category vehicles (in particular their electric and plug-in hybrid powertrains as well as vehicle bodies for a variety of users and uses), and also will make broad use of virtualisation and simulation methods such as Integrated Co-Simulation and the FMI / FMU automotive industry standard. The potential of this approach will be demonstrated by several electrified L-category vehicles, both physical models (prototypes) and virtual models.

This **EU-LIVE Modular Platform** guarantees re-usability, flexibility and sharing of components and subsystems for L-category vehicles (in particular for electrified powertrains), and can be applied to different types of such vehicles – ranging from more close-to-the-market to radically new ones – offering quiet, clean, energy-efficient and safe personal mobility in urban areas.

One main focus of EU-LIVE is on user acceptance. Therefore typical users are involved in tests during and at the end of the project. Additionally, an open innovation call will take place to obtain innovative ideas concerning radically new vehicle designs. This repeated user involvement will help to minimise development risks. The insights gained will ensure optimal market suitability of the vehicles and thus lead to quick dissemination of L-category vehicles.

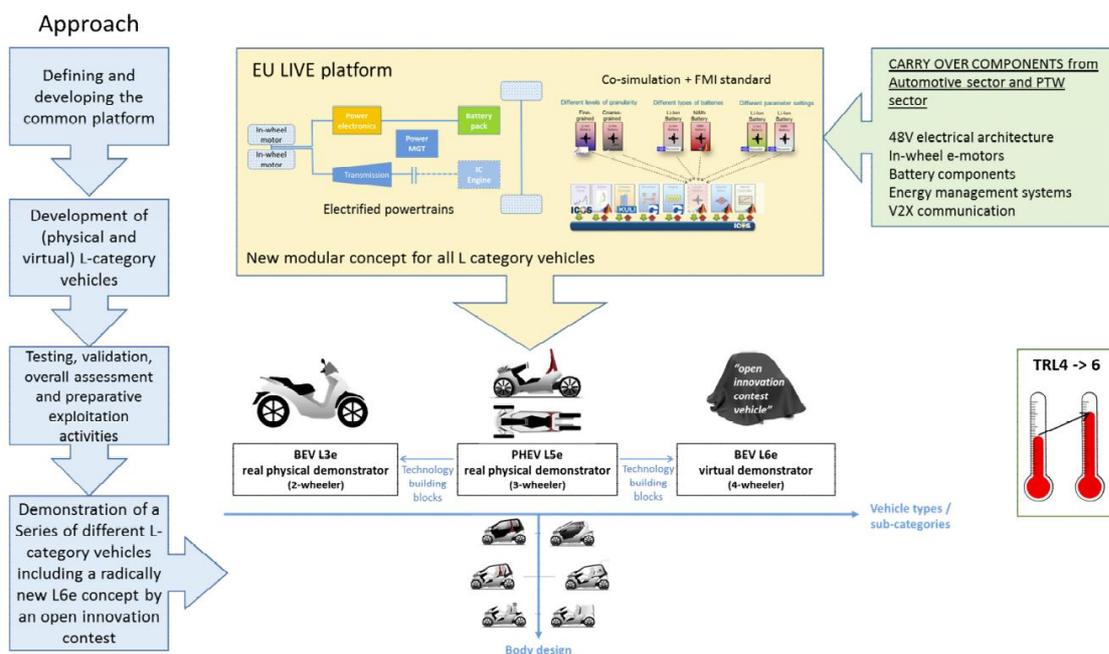
The objective of **EU-LIVE - “Efficient Urban Light Vehicles”** is to overcome the existing barriers of L-category vehicle industry on the basis of intense collaboration and transfer of know-how concerning methods, components and technologies from the high-volume automotive industry. By covering a wide range of L-category vehicles and applying a modular approach, it helps producers to generate economies of scale. Accordingly, it makes a substantial contribution towards overcoming the challenges of future urban mobility and creating a long-term sustainable mobility system.

Results

To comprehensively prove the elaborated strategy of EU-LIVE and the modular platform, the following demonstrators are being developed:

- > Real-life demonstration of an **innovative, fully-fledged three-wheeler as a plug-in hybrid electric vehicle (L5e PHEV)**, showing real driving emissions below Euro 5 level, reduced noise, greenhouse gas emissions and energy consumption, serving as the flagship.
- > Real-life demonstration of a **scooter (L3e) as a purely battery electric vehicle (BEV)** using technology building blocks / carryover parts transferred from the L5e PHEV.
- > Virtual demonstration of a **radically new ultra-light four-wheeler (L6e) as a BEV** concept, in order to show the full potential in the transferability of technology building blocks across different vehicle categories and developed in an **open innovation contest**.

In conclusion, the EU-LIVE project is designed to provide a clear route to market for a range of L-category vehicles, taking into account requirements from series production, total cost of ownership (TCO), full comfort, safety and connectivity as for common passenger cars, for both European and non-European markets.



Partners:

The EU-LIVE project is being carried out by an international consortium with comprehensive expertise in the areas connected with mobility and automotive development. It represents a promising mix of leading industrial companies and knowledge centres perfectly able to respond to the future challenges of urban mobility. The consortium consists of major European manufacturers of passenger cars and L-category vehicles, Tier 1 suppliers of components and sub-systems, SMEs and research centres specialised in mobility and the automotive sector. The know-how of this interdisciplinary think-tank, which covers the complete value chain of vehicle design, development and production, ensures the sustainable market exploitation of the project results.



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