

Best-in-class urban electric vehicle: BEHICLE

Safe urban mobility in a sustainable transport value-chain

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1. Motivation

The world's cities are under pressure. With the urban population set to rise to 4.9 billion by 2030, the race is on to find ways to reduce their ecological footprint. The estimated one billion plus vehicles on the roads means city planners are looking for solutions to the widespread, chronic problems of urban congestion and pollution. As a result of this new scenario, it is clear that new mobility solutions are needed.

Among these solutions, the urban EVs emerge as a sensible way of maintaining personal mobility without emission impact, but due to the existing urban traffic conditions, where many types of vehicles co-exist, these new generation of EV must be safe in two ways. First, performance must be such that maneuverability is ensured, with compelling acceleration. Secondly, in the case of a crash of any type, the vehicle must ensure the protection of occupants and pedestrians. It is clear that the focus on compatible safety and efficiency will require specific solutions which will be somewhat common to this new generation of vehicles.

Urban environments are nowadays the natural place for EVs to be but it is fundamental for the success and viability of EVs to respond to evolving customer demands, where it is mandatory to develop light, affordable, safe, ergonomic and energy efficient EVs for the global customer. Therefore efficiency and an adequate level of performance are demanded to EVs in order to co-exist safely with existing vehicles.

2. Project focus

The BEHICLE initiative has been conceived in order to deliver a safe, lightweight, performance enhanced and updated version of an existing urban Electric Vehicle EV, Ecomove Company's Qbeak.

With the determination of obtaining a Best-in-Class rating, BEHICLE developments will be focused on fulfilling safety requirements as defined by Euroncap assessment. It will pursue consumption and electric range targets established on the topic, by integrating off-the-shelf powertrain and battery systems, whilst maintaining a lightweight structure based on conventional manufacturing technologies.

A preliminary crash test, performed at the beginning of the project, will serve as a benchmark to establish an Improvement Action Plan, from which a safer version will be conceived.

The improvement strategy will place emphasis on safety cage renewal, on energy absorption modules, as well as safety features for driver and passenger. The Body-in-White material mix will feature metallic materials and thermoplastic with metallic reinforcements.



4 BEHICLE prototypes will be manufactured and tested according to EuroNCAP requirements. Crash compatibility scenarios will also be assessed by virtual means.

It is the intention of the BEHICLE consortium to exploit results related to the complete car according to innovative business models. The modular conception of BEHICLE will allow decentralized production and local assembly in the user's cities. This will provide with local job creation around all the European municipalities in which sustainable mobility by means of BEHICLE concept will be implemented.



3. Expected Impact

BEHICLE initiative's results, from a measurable point of view, can be summarized as:

- Development of a lightweight architecture with a maximum vehicle weight of 550 kg including batteries and one occupant
- Acceleration: From 0 to 100 km/h below 10 s
- Average energy consumption: 7 kWh/100 km
- 80 Wh/ km energy consumption in real urban driving conditions
- At least 150 km pure electric range in real urban driving conditions
- EuroNCAP crash tests results of 4-5 stars.

