

DELIVERABLE REPORT

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PROJECT TITLE: **CONFIGURABLE AND ADAPTABLE TRUCKS AND TRAILERS FOR OPTIMAL TRANSPORT EFFICIENCY**

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Executive summary

This deliverable covers two kinds of simulations. On one hand a big part of the holistic simulations are mentioned and their results are analyzed. On the other hand the investigations and CFD simulations regarding the aerodynamic effects of the two TRANSFORMERS trailers are shown.

Part 1 - Holistic Simulations:

This deliverable gives only a short overview of the simulation matrix, the routes and the variations that have been done within this project. The detailed information about these topics can be found in deliverable 2.4.

The results shown in this document refer to the cases defined in the simulation matrix. The approach was to do simulations for only one route first, analyze the results and take the most promising cases as a starting point for the other routes.

Chapter **Error! Reference source not found.** is dealing with the results of the simulations with a conventional battery. The main variations here are the maximum EMG torque, the battery size, weight and traffic conditions. These simulations result in an optimal configuration for each route.

The results show the impact of a higher maximum EMG torque and the importance of a right sized battery for different scenarios, depending on the recuperation potential of the certain route.

For the next simulations the focus was on combining a supercapacitor with the battery, to see the effects of these configurations. The major benefit of supercapacitors is the extension of the lifetime of a battery.

In chapter **Error! Reference source not found.** the conventional battery was replaced by a plug-in battery. Due to the shorter distances of the routes it was decided that a plug-in scenario is defined by a high initial state-of-charge but no recharging is done along the route. This configuration shows benefits in costs (current is cheaper than Diesel) and would be good for the environment if the current comes from renewable sources.

Chapter **Error! Reference source not found.** covers the results of aerodynamic variations for two of the routes. The aerodynamic input of the simulations is referring to the relative results of the DAF aerodynamic tests and shows that the "high tapered" position of the HoD trailer with bout tails folded out shows the best results.

Part 2 - Aerodynamic Investigations:

This part of the deliverable describes first the methods of the CFD simulations and the investigations that have been done for different trailer shapes. The most promising shape was developed further. Additional aerodynamic features like side wings, bulk head and boat tail were considered for further simulations.

The height for the two TRANSFORMERS trailers (the Schmitz Cargobull Hybrid-on-Demand Trailer and the Van Eck 4-segmental Trailer) was calculated for the Volvo and the DAF truck to find the optimal configuration of the trailer roofs. With additional CFD simulations the $c_D \cdot A$ values and volume changes for these combinations were investigated.

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