Electric Vehicles for Urban Logistics and Commercial Transport – User Needs and Obstacles
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Extended abstract

Objectives and motivation
The European Commission is expecting European countries to reduce their annual greenhouse gas emissions by at least 20% by 2020 and by 60 to 80% by 2050, compared to 1990 emissions level (1). With commercial transport and logistics currently contributing to an estimated 20 to 25% of overall global CO₂ emissions (2), evaluating the efficiency of current distribution structures and investigating into alternative energy sources for transport is important. The need to reduce emissions, CO₂(e) as well as noise emissions, is particularly important in cities and urban areas, where population is dense and a lot of traffic is related to commercial transport and distribution services; e.g. in Berlin, Germany, about a third of the urban traffic is commercially motivated traffic (3). The interest in considering electromobility as an alternative for conventional urban commercial transport is further accelerated by the fact, that many distribution vehicles are equipped with diesel engines, which are often not state-of-the-art regarding minimisation of emissions, and therefore these vehicles further contribute particles to the emission-problem in addition to fumes and noise. Electric vehicles for urban logistics therefore are an alternative worth considering when aiming for reduction of local emissions.

Despite research, fundings and projects run jointly by OEMs, ministries and research, the number of electric vehicles currently used for urban logistics is still very limited though. It is the aim of this research to map out the user needs of urban logistics providers in regards to vehicles and routings, based on empirical research done, using the example of Berlin and to contribute to the discussion, how and in which urban logistics segments a swift move to electric vehicles might be realised and desirable. The research reflects identified needs, concerns and discrepancies between perceived needs and concerns and actually measurable needs and concerns. Based on this analysis, obstacles of a move to electric vehicles are shown. Furthermore, considering financial structures of investments in vehicles and fleets in combination with the identified needs, the research suggests areas where a move to electric vehicles could be achievable.

General description
In 2014 an extended empirical research in form of an online survey was carried out in Berlin in order to gain in-depth insight into the structures of commercial transport, its tours and shift structure and the participants expectations towards the usability of electric vehicle for their operations: over 340 businesses in the urban area of Berlin where contacted to identify the best point of contact for the survey. Over 120 contacts were identified and agreed to participating into the survey. By the means of a questionnaire of 56 questions participants in the survey were asked to specify their fleet structure, ownership of vehicles, touring development behaviour, touring patterns, including e.g. average route, longest route, average number and length of stops etc., shift patterns, user expectation towards electric vehicles. Around 33 of the approached contacts answered to the questionnaire: The companies of the sample are mostly smaller companies with less than 200 employees, 2 million annual turnover and their fleets comprises 1 to 5 vehicles. In most cases vehicles are out of service for at least eight hours per day. Thus, charging them is possible without problems, even if no fast charge option is available. An analysis of the tour patterns reflects, that there is no pattern regarding tour length, parking time, shifts etc. which can be related to a particular industrial sector:
As a consequence, there is no evident direct link between industrial sector and suitability for electromobility. Instead, the dominating purpose of routings gives an indication on whether electric vehicles can be used within the fleet of an organisation or not.

A further analysis of the answers of the survey gave insight into the behaviour of commercial transport participants and in their motivation. The findings therefore contribute to understand the motives and decision parameters that need to be addressed for achieving a shift to electric vehicles for urban commercial transport and logistics. In particular financial concerns were raised during the online survey. With prices for electric vehicles still being above comparable combustion engine vehicles in general, it is therefore important during the introductory phase of electromobility to focus on transport segments, where the ratio of engine costs to overall costs of the vehicle is relatively low, until economics of scale in the production of electric engines can be passed on to consumers.

**Results and conclusions**

The research presented has shown, that there is no direct link between industrial sectors and the suitability for electric vehicles. Organisations may primarily belong to the sector of logistics services, yet they may or may not be suited for changing their fleet from traditional combustion engines to electric propulsion. Furthermore, the perceived suitability of an organisation may not necessarily be identical with its factual suitability for the use of electric vehicles in its fleet. So whereas the purpose of routings gives an indication on the feasibility of a change, it is important to take into consideration that perception of suitability and costs of vehicles can be serious obstacles that need to be dealt with, when wanting to shift transport in cities to electromobility. As the presented considerations have shown, it therefore is important to further encourage the discussion on electromobility and to spread the understanding of it on one hand. Furthermore, vehicles need to be accessible at comparable costs when considering TCO but also when looking at the vehicle acquisition. The market segment of special vehicles, where engine costs are a minor component in the vehicles cost structure, therefore is a market segment that should be given more attention.

**References**


**Keywords**: urban logistics; electric vehicles; user needs; TCO;