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Electric light commercial vehicles – are they the sleeping giant of electromobility?

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This article is a summary of a study that looked into the current state of electric light commercial vehicle (eLCV) deployment in the European Union and carried out research on the total cost of ownership (TCO), suitability for vehicle fleets and policy measures to drive the uptake of eLCVs. The study estimated the TCO to enable a comparison to be made between the costs associated with eLCVs and those for conventional light commercial vehicles (LCVs). An eLCV uptake scenario was also developed to identify the potential impact of eLCVs on carbon dioxide (CO_2) and air pollutant emissions.

To transition to a climate neutral economy, carbon dioxide (CO_2) and pollutant emissions from transport must be decreased drastically. The transport sector was responsible for around 27% of total European Union (EU) greenhouse gas (GHG) emissions in 2017. Light commercial vehicles (LCVs) accounted for 9% of emissions from transport and have emitted increasing levels of GHG emissions since 2017. More low and zero emission vehicles are needed to decarbonise transport. Transport electrification in the form of electric vehicles (EVs) is one of the technologies with the most potential and market penetration over the last decade.

Cars have attracted most attention in the EV market, but LCVs have also seen a rising trend in EV registrations. Since LCVs are mostly used in commercial fleets, their electrification could contribute substantially to reducing emission levels. One advantage LCVs have over cars is that they have more predictable operating patterns, allowing better charge management. Fleet managers are also more likely to take the total cost of ownership (TCO) into account compared to car owners. Therefore, they are more likely to consider the lower running costs that EVs offer compared to conventional vehicles.

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Furthermore, because of the rapid rise in e-commerce over the past few years, the demand for LCVs to carry out the last-mile deliveries has increased significantly – and has been further accelerated by the coronavirus (COVID-19) crisis.

The study provides an analysis of current and future eLCV deployment trends in the EU, covering the economic and environmental considerations of eLCVs. It also provides an overview of research and policy background on eLCVs, such as previous TCO analysis, suitability of LCV fleet electrification, surveys of fleet managers and studies on policy support measures. In addition, the study carried out a TCO analysis, and an analysis of energy consumption, emissions and air quality impacts in different deployment scenarios.

A previous TCO analysis showed that eLCVs approach the TCO of conventional LCVs when they have travelled 16,000 km a year. It also stated that a battery price reduction of between 25% and 75% would be required to make eLCVs a more competitive alternative at lower annual distances. Surveys of fleet managers have shown that eLCVs are increasingly being considered as alternatives to conventional LCVs. However, surveys also showed that fleet managers perceived the limited public charging infrastructure, limited range and high purchase prices of eLCVs as disadvantages over their conventional counterparts. The possibility of charging at a depot, lower operating costs and better environmental performance were listed as the main advantages. Studies on policy measures showed that subsidies, tax exemptions and low-emission zones were considered important tools. However, they did not solve the issue of the limited range of eLCVs, which may be somewhat addressed by investing in public charging infrastructure.

The study began its analysis by collecting data on the current fleet, future targets and existing policy goals. Following this, future scenarios of LCV electrification were developed to quantify the impact of eLCV uptake. To determine the TCO of eLCVs, the study collected data on the three cost types included in the TCO – base vehicle and technology costs, energy costs, and maintenance costs. The TCO is a crucial input when making purchasing decisions. It enables a direct comparison to be made between different eLCVs and with conventional LCVs. Finally, the CO_2, pollutant emission and air quality impacts of eLCVs and LCVs were analysed.

The TCO analysis of small eLCVs compared with conventional LCVs indicated that the electrified versions provided more value than their conventional counterparts. This was due to the lower energy and other operating costs alongside comparable vehicle costs. Over 15 years, small eLCVs can save around EUR 2,600. However, medium and large eLCVs had higher costs of EUR 741 and EUR 1,745 respectively over 15 years compared with conventional LCVs. Furthermore, it was assumed that vehicle costs were written off after 15 years rather than the typical 5 to 9 years. This may favour eLCVs because it spreads the higher vehicle cost of eLCVs over a longer period of time and increases the impact of energy cost savings of eLCVs compared to conventional LCVs. However, when accounting for current subsidies and incentives, small and medium eLCVs are financially more attractive than conventional LCVs in almost all cases, even when considering a 5-year TCO.

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The study developed two scenarios. The 'eLCV scenario' assumed that all newly registered LCVs will be battery electric vehicles (BEVs) by 2030. The 'benchmark scenario' assumed a 30% market share of eLCVs by 2030. Both scenarios show a decline in emissions over time due to increasing electrification, even though the distances travelled by LCVs are projected to increase by 12% by 2030. The eLCV scenario predicted a 30% reduction in CO_2 emissions from LCVs in the EU in 2030 compared with those in the benchmark scenario.

Furthermore, in the eLCV scenario, the oxides of nitrogen (NOx) and particulate matter (PM) emissions are expected to be 22% and 7% lower (respectively) than in the benchmark scenario.

The study shows there has been steady growth in the eLCV market over the past years and found that increased electrification could reduce the CO_2 emissions from LCVs by as much as 30% by 2030. The recent spike in demand for e-commerce could make the demand predictions for LCV transport appear conservative and encourage more fleet managers to consider eLCVs as cost-competitive and more environmentally friendly compared with conventional LCVs. Nonetheless, barriers such as vehicle range and charging infrastructure are still lacking and might be the last hurdle before widespread adoption of eLCVs for last-mile delivery.

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