

PERCEPTIONS OF USING ELECTRIC- AND ALTERNATIVELY FUELED FREIGHT TRUCKS AMONG ROAD HAULAGE COMPANIES

Erika Kallionpää, Sheba Nair & Heikki Liimatainen

Transport Research Centre Verne

Tampere University

erika.kallionpaa@tuni.fi

sheba.nair@tuni.fi

heikki.liimatainen@tuni.fi

ABSTRACT

Purpose

Due to increasing emissions and general sustainability targets both in Finland and in the EU, the logistics sector is facing development challenges. The European Green Deal (European Commission, 2020) aims to cut transport greenhouse gas (GHG) emissions by at least 90% compared to 1990 levels by year 2050. Therefore, new operation models and measures in logistics are needed. On the other hand, continuous technological development (e.g., battery technology) offers new possibilities to decrease emissions and to address development challenges. The purpose of this study is to find out the current perceptions of road haulage companies on the deployment and the use of electric freight trucks (EFTs) and alternatively fueled freight trucks (AFFT) as fleet vehicles in Finland, both as a part of urban logistics operations and long-haulage transport. The aim is to clarify and estimate the prospects about the willingness to invest in and to deploy EFTs and AFFTs, and to investigate the possible barriers to invest in EFTs or AFFTs, now and in the future.

Design/methodology/approach

The paper is based on literature review and a case study in the form of expert interviews from selected road haulage companies operating in Finland. In the literature review, the perceptions, and experiences of using EFTs and AFFTs in daily operations both in urban areas and long-haulage transport are studied. In the case study, the perceptions and the prospects of the deployment and the use of EFTs and AFFTs are examined. The employees from road haulage companies are interviewed using semi-structured interview method, and content analysis is carried out to analyze the answers.

The following research questions are answered in this article: 1) What kind of perceptions do road freight companies have about EFTs or AFFTs? 2) What are the factors affecting the competitiveness of the use of EFTs or AFFTs? 3) What are the current barriers to and benefits of the deployment and the use of EFTs or AFFTs? and 4) What are the recommendations offered by road freight companies for accelerating the growth of the potential of either electrification of freight trucks or using AFFTs?

Findings

As a result, the perceptions and prospects of using EFTs or AFFTs among road haulage companies are introduced. Based on the content analysis, the barriers and the incentives are presented in prioritized order. Generally, the road freight companies are open to and are interested in using EFTs and AFFTs, since there are many benefits, compared to conventional diesel-powered trucks, already known and recognized. However, there are still some barriers to using and investing in EFTs or AFFTs.

We identified that the road freight companies are aware of the advantages of using EFTs or AFTTs. The most important one is the positive social and environmental effect they bring. Another added advantage relates to night-time deliveries in inner cities. The EFTs enable the operations during night-time in city center and in areas with urban access regulations due to local noise restrictions. On the other hand, the barriers that the companies face are, for example, the high initial investment, underdeveloped charging infrastructure, limited research on the adoption of EFTs or AFTTs, short driving ranges and operational stability. The freight companies also suggested that the factors affecting important aspects for zero-emission adoptions are purchase price, battery life, incentive schemes, charging solutions, policy facilitation, route feasibility, distance traveled, and specific local characteristics (e.g., topography, temperature, etc.). Some recommendations that were offered were good access to fast chargers, support schemes and exemptions of road toll charges, access to bus lanes, incentives, and low purchase price.

Original/value

The paper gives valuable new information and decision support for companies when considering investments in EFTs or AFTTs and, for example, for cities when considering developing their urban environment and infrastructure, especially support for charging electric distribution vehicles. In order to reach the sustainability targets and decreasing emissions, it is important to be aware about the current perceptions of using EFTs or AFTTs among road haulage companies. These perceptions give a basic guideline for future actions to authorities, decision-makers and other stakeholders in public sector. Since earlier studies have failed to provide an insight into user preferences or experiences of using EFTs or AFTTs as fleet vehicles, we contribute to the current literature by uncovering the unique perceptions of road haulage companies on the use of EFTs or AFTTs.

Key Words

User perceptions, electric freight trucks, alternatively fueled freight trucks, road haulage companies, sustainability

Source

Cornelius, M., Plötz, P., Hadwich, K. and Wietschel, M. (2020), "Are Battery-Electric Trucks for 24-Hour Delivery the Future of City Logistics? – A German Case Study", *World Electric Vehicle Journal* 2020, 11, 16, pp. 1-19.

European Commission. (2020), "A European Green Deal", European Commission, available at: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en#actions (accessed 18 July 2021).

Lebeau, P., Macharis, C. and Van Mierlo, J. (2016), "Exploring the choice of battery electric vehicles in city logistics: A conjoint-based choice analysis", *Transportation Research Part E*, Vol 91, pp. 245-258.

Liimatainen, H., van Vliet, O. and Aplyn, D. (2019), "The potential of electric trucks – An international commodity-level analysis", *Applied Energy*, Vol. 236, pp. 804-814.

Quak, H., J. (2015), "Access Restrictions and Local Authorities' City Logistics Regulation in Urban Areas", Tanighuchi, E. & Thompson, R.G (Ed.), *City Logistics: Mapping the Future*, CRC Press.

Quak, H., Nesterova, N. and van Rooijen, T. (2016), "Possibilities and barriers for using electric-powered vehicles in city logistics practice", *The 9th International Conference on City Logistics*, Tenerife, Canary Island 2015, *Transportation Research Procedia* 12, pp. 157-169.

Weiss, M., Cloos, K., C. and Helmers, E. (2020), "Energy efficiency trade-offs in small to large electric vehicles", *Environmental Sciences Europe*, 2020, 32:46, pp. 1-17.

Yang, L., Hao, C. and Chai, Y. (2018), "Life Cycle Assessment of Commercial Delivery Trucks: Diesel, Plug-In Electric, and Battery-Swap Electric", *Sustainability*, 2018, 10, 4547, pp. 1-21.