Developments in Electric Freight 2013 – 2017

Purpose

The FREVUE State of the Art review, and its updates from 2015 and 2017, analysed technological, environmental and performance developments of electric freight vehicles (EFVs) deployed in the FREVUE project, as well as developments in vehicle economy and local policy.

Evaluation

- The technical performance of vehicles is good, as is the safety record.
- The vehicles are recognised as fit for the specific type of urban logistics operations carried out.
- However, there was a persistent wish for increased range.
- EFVs provide clear operational and environmental advantages. Charging strategies and drivers' behaviour had an influence on these advantages and the performance of the vehicle.
- Battery costs continue to be a major profitability barrier, combined with the limited availability of vehicles.
- Government support is still essential, combining a variety of stakeholder-specific measures.

Conclusion

A growing number of light EFVs are used in city logistics, and production volumes are growing. Availability of medium-sized and large EFVs remains limited, however.

Context

Electric freight mobility is a fast-changing field. A growing number of city logistics operations are performed by electric freight vehicles, especially using light-duty vehicles. Despite this, there are still many barriers to a wide uptake of EFVs.

During the FREVUE project (2013 – 2017), we followed developments in the electric freight market, focusing on trends and changes in technology, operations and economics; environmental and social changes, as well as local policy and governance structure.

These developments were reported in three editions of the FREVUE "State of the art of electric freight vehicle implementation in city logistics" report, including results from:

- Recently commenced or completed projects and demonstrations, as well as results from national funding programmes that include electric freight vehicles in city logistics.
- Research articles investigating results from the use of electric freight vehicles in city logistics.
- Experiences from FREVUE demonstrators and follower cities.

Technical performance: Looking beyond the vehicle

Back in 2013, the main considerations of transport operators were around the technical performance of the vehicle itself: what is the real range? How to introduce charging into the vehicle routine? What is about performance and safety of the battery?

With many of these issues now resolved, focus has shifted to the integration of the electric fleet in the transport operator value chain. Getting larger vehicle fleets requires thinking about the integration with electricity supply and power networks – new elements in the transport operator value chain. In this framework, the further development of a smart grid environment is largely supported by the authorities and operators.

Optimising auxiliary elements of EFVs, driver behaviour and IT systems has become necessary to further improve low operational costs of the vehicles. Maintenance and after-sale support for EFVs, which depends significantly on the vehicle dealer/manufacturing company as well as location remains to be one of the most critical factors influencing the waiting behaviour of transport operators prior to buying the vehicle.

Operational performance: Making the best of what is available

The range currently offered by EFVs is sufficient for most city logistics operations. These are last mile deliveries with many starts and stops, limited (fixed) route length, significant idle time and relatively low average speeds.

Despite improvements being made on range, there is still a wish among operators to extend this, so vehicles can be used on a more ad-hoc basis, and to extend the scope of activities possible.

Fast charging is a favoured strategy for extending vehicle range, but will only be possible if improvements are made, charging protocols are standardised and extensive charging infrastructure is built.

Despite initial reports that charging might be a time-consuming barrier to using EFVs, this situation has been reversed today. The ability to charge at the depot has been identified as being one of the critical advantages of EFVs, as transporters save time and distance by not having to drive to fuel stations.

Economics: Better understanding of costs and benefits, but not making a business case yet

As in 2013, in 2017 the economics of the EFV market is largely hampered by the limited supply/choice of the EFVs, specifically in medium and large duty segment. This prevents further uptake of EFVs, particularly among small operators, and comes alongside limited information on currently available models.

The EFV market is evolving, with light vehicles already available from major vehicle manufacturers, and the announcement of medium-sized and heavy vehicles to come soon. At present, in the segment of larger trucks it is smaller companies that are more active, mainly focusing on the conversion of conventional fleets to electric.

In relation the EFV total cost of ownership, even though there is overall a better understanding of the operational vehicle costs (e.g. maintenance and operational costs) specific uncertainties, e.g. about residual values, remain, weakening the EFV business case. Battery costs continue to be a major profitability barrier, as well as overall on-demand production of the vehicles.

There is now a sound business case for light duty electric freight vehicles, but this is not the case for medium and heavy duty vehicles.

Environmental, social and attitudinal impacts: : confirmation of positive trends

Data from FREVUE demonstrations confirmed that the main strength of EFVs is their environmental performance, from reduced CO2 as well as local air and noise pollution. EVs continue to be very well-perceived by the general public, and companies increasingly believe that electrification is inevitable. There are concerns, however, about the adverse effects on congestion from more vehicles being introduced into fleets.

With the major environmental benefits of EFVs being recognised, the necessity of clean and renewable energy usage in EFVs becomes increasingly important, as the next step in moving to zero emissions. Research is being conducted to see how recycling batteries can further improve environmental performance, as hazardous materials from batteries could enter the waste stream at both the end of a battery's useful life, as well as during its production.

Local policy and governance structure: no policy fits all

In 2013, programmes supporting electromobility were organised on a national level, whereas now almost all big European cities have electromobility on their political agenda. National programmes are now integrating all aspects of electromobility: infrastructure, regulation, subsidies and promotional campaigns.

Supportive government policy is highly important for the uptake of EFVs, so governments are trying to provide market certainty. This includes non-monetary incentives and also subsidies, though the latter are not sustainable in the long-term. These incentives have to be implemented well to be effective. Public authorities can also use public procurement as a way of supporting the uptake of EFVs.

Lessons learnt

Opportunities lie in the improvement of battery and vehicle technical performance, supporting governmental regulations and commitments to zero emission policy, as well as increasing scale advantages in production and the electrification of other transport segments.

The main obstacles are related to the availability of charging equipment and vehicle supply, prices of fuel and electricity and the potential for improved environmental performance of vehicles running on alternative fuel making them a more desirable option than EFVs.

Further information

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More information: D3.1 Technical Suitability of EVs for Logistics

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