

Total Cost of Ownership for Small Electric Freight



Purpose

This factsheet provides a TCO (total cost of ownership) comparison between small-sized EFVs (electric freight vehicle) and CFVs (conventional freight vehicles). The TCO is one of the most important factors in the procurement phase.

Context

The total cost of ownership (TCO) of a vehicle is an important factor in the decision to buy an EFV or a CFV. Making the TCO of an EFV cheaper than or similar to that of a CFV was often a minimum requirement for freight operators in FREVUE.

Based on data from the operators in FREVUE, the TCO comparison aims to identify what can influence the TCO. The TCO comparison's results differ by vehicle type and usage, and many other elements, which can be country or even company specific, should be taken into consideration.

Evaluation

This TCO comparison is based on actual data of FREVUE operators. It shows the sensitivity towards changes in currently uncertain events, and how different elements influence the TCO.

Conclusion

For small EFVs (less than 3.5 tonnes) the TCO can be favourable for an EFV within about five years if the vehicle drives 60 kilometres a day. Small EFVs are already available from some Original Equipment Manufacturers (OEMs), which reduces the price barrier, but also increases the availability and accessibility of these vehicles.

Economics

The market for conventional vans is dominated by relatively low cost products, as there is no market for luxurious vans (in contrast to passenger cars and trucks). Therefore, the relative expensive electric van has to compete with a value for money conventional vehicle. For this segment OEM-produced vehicles are available and used, i.e. Nissan eNV200 and Renault Kangoo ZE.

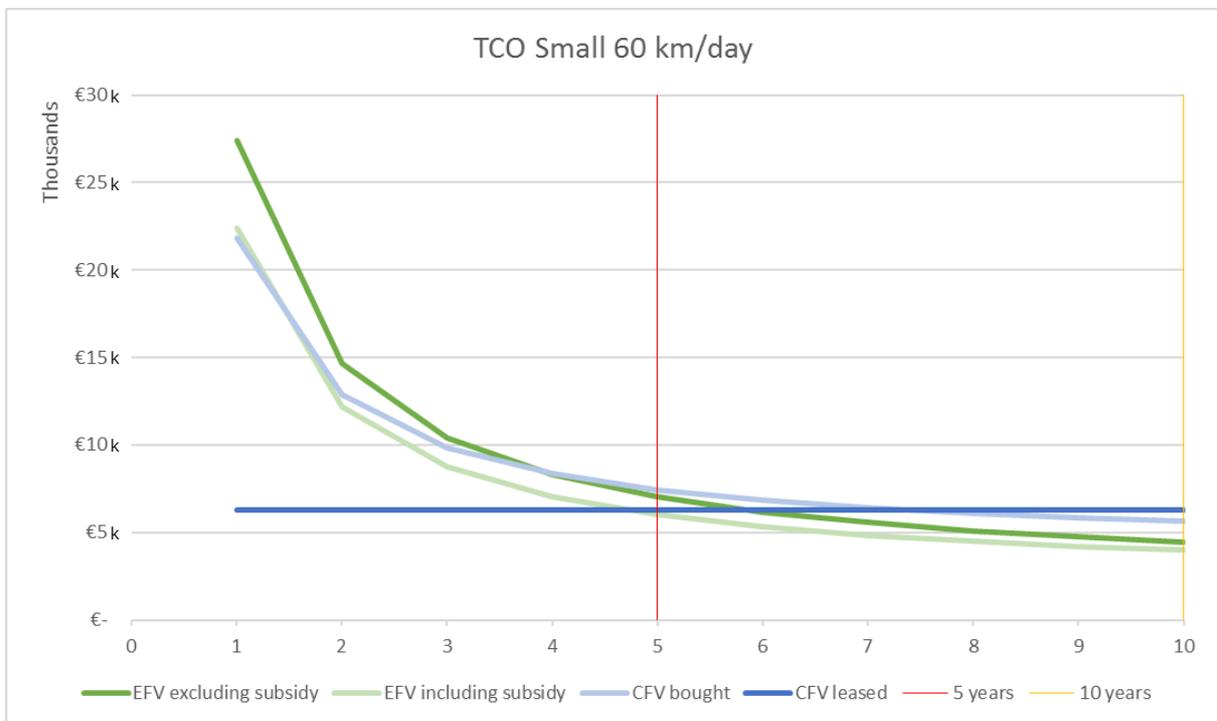


Figure 1. Development of yearly TCO per year-operated small sized vehicle (average 60 km per day)

The horizontal axis in Figure 1 shows the total annual costs of both an EFV and a CFV up to ten years. For example, the TCO of a non-subsidised EFV with a lifetime of 8 years is approximately € 5000 per year, so € 40,000 in total.

Without subsidy there is a break-even point at about four years for a vehicle covering 60 kilometres per day (depending on tax benefits, maintenance costs for conventional vehicles, etc).

The TCO over a period of 10 years is very favourable for the EFV, but the demonstrations in FREVUE did not last long enough to show if a time period of 10 years is also technically feasible.

Figure 2 shows the subdivision of cost elements for a lifetime of 5 years, the same as the cross-section depicted by the red line in Figure 1.

The purchase price is by far the largest cost driver for an EFV, but does not differ much from the purchase price for CFVs, especially compared to larger EFVs. Since operating costs (fuel vs electricity and maintenance) are lower for an EFV and investments for charging infrastructure are relatively low for small sized EFVs, the break-even point is typically within the first 5 years of ownership.

Note that, although from a TCO point of view the EFV performs quite well, operationally it still has some limitations, such as range, which can be a barrier for large-scale uptake.

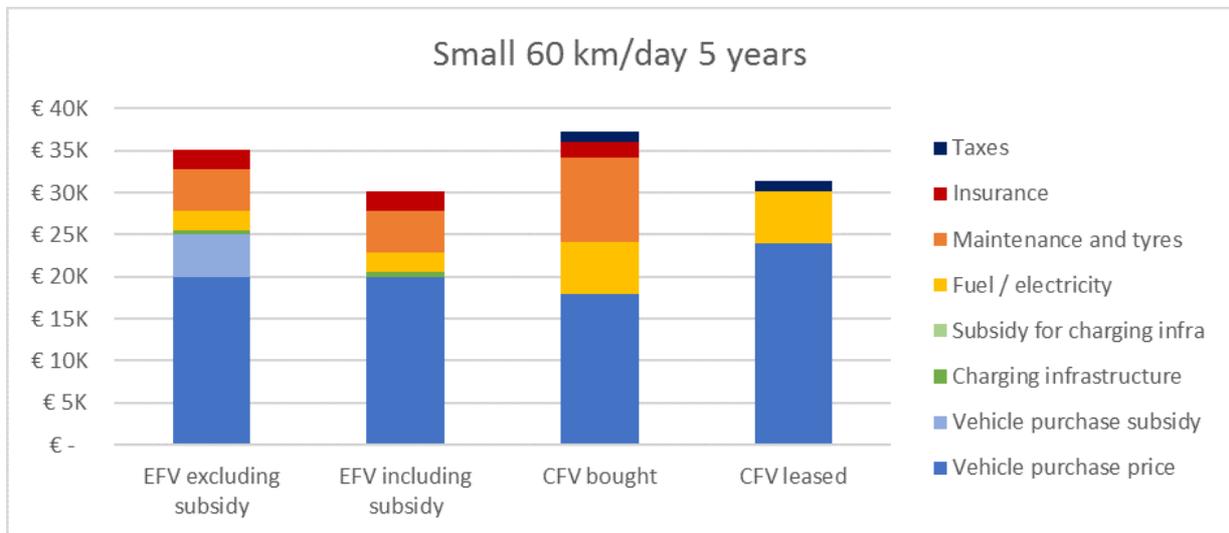


Figure 2. TCO small size vehicle (5-year cross-section – 60 km per day)

Maintenance costs are relatively high in the TCO comparison for small vehicles; the values we received from partners varied considerably for maintenance contracts and repair costs. This is striking for the TCO comparison for small vehicles, as the vehicle procurement costs are – in comparison to the medium and large trucks – relatively low and therefore the maintenance and repair costs are a large proportion of total costs in the TCO for small vehicles.

As operational costs for EFVs are lower than CFVs', the TCO is even more favourable for the EFV when an operator uses the vehicle for more kilometres per day.

The residual value of the vehicle was not included in the figures, either for EFVs or CFVs. The residual value of an EFV is one of the main uncertainties operators currently face. The FREVUE vehicles are still running (at the time of reporting), so do not provide an answer to this question.

What the second-hand market will be for EFVs or for the battery is unknown. Adding residual value to the comparison shows that if there is a value for the vehicle and the battery after 5 or 10 years, the TCO comparison is even more positive for the small EFV.

Conclusion

At an average distance covered of 60km per day, the TCO for an EFV lighter than 3.5 tonnes can be similar to that of a CFV over five years. The longer the distance covered, the more favourable the TCO for an EFV becomes. Limited range and low payloads remain as barriers to EFV uptake, but with small EFVs being already available from vehicle manufacturers, the cost barrier to EFV use is diminishing.

Further information

TNO: Hans Quak
hans.quak@tno.nl

FREVUE Coordinator:
Tanja Dalle-Muenchmeyer
tdmuenchmeyer@westminster.co.uk

FREVUE website:
www.frevue.eu

More information: D3.2
Chapter 3
frevue.eu/reports



The FREVUE project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 32162

The sole responsibility for the content of this document lies with the authors. It does not necessarily reflect the opinion of the European Union. The European Commission is not responsible for any use that may be made of the information contained therein.