In September 2017, the co-funded European Project FREVUE concluded its 4.5-year, large-scale initiative to test electric vehicles (EVs) in real-world urban logistic operations. The trials took place
in eight European cities that were selected to demonstrate EVs in a range of climatic conditions, differing urban environments and distinctive local policy settings.

FREVUE demonstrated that, by working together, logistics providers, local authorities, goods manufacturers, vehicle manufacturers and service providers could successfully operate EVs in urban environments – producing significant positive benefits.

The project involved a wide range of public and commercial entities, ranging from grid-power providers and commercial vehicle manufacturers, to sectors such as retail, food and drink and post and parcel distributors. This achievement, along with the geographical spread and time-scales over which the project was run, enabled the detailed study of not only the capital costs and benefits of electric freight vehicles (EFVs), but also day-to-day experiences of personnel using the vehicles and the longer term environmental benefits.

*Image courtesy of Heineken*

**Context**

FREVUE brought together 32 carefully-selected partners to collaborate in the introduction of EVs to ‘last-mile’ logistics in urban areas. The project co-ordinators, Cross River Partnership (CRP), oversaw the introduction of over 80 EFVs across various sectors in the eight different cities.

**Partners involved in the project:**

**Cities:**

- The City of Oslo
- Trafikverket (Swedish Transport Administration) and the City of Stockholm
- The City of Westminster and Transport for London (TfL)
The City of Amsterdam
The City of Rotterdam
The City of Milan
EMT Madrid (Empresa Municipal de Transportes de Madrid)
EMEL Lisbon (Mais Mobilidade Melhor Cidade)

Commercial operators, research partners and support partners:

- EV manufacturers: Nissan and Smith Electric Vehicles
- Power grid suppliers: Fortum and UK Power Networks
- Logistics and distribution operators: TNT, UPS, CTT, SEUR, Bring, Breytner and ARUP
- Product manufacturers and distributors: Heineken and Calidad Pascual
- ICT providers: ITENE and Atos
- Research and support partners: FIER Automotive, Hyer, Imperial College London, POLIS, SINTEFF and TNO

In action

The types of supply chain involved in the demonstration project ranged widely – retail, waste management, construction freight activities, post and parcel logistics, food and drink, movement of pharmaceutical goods, as well as maintenance and services operations. Each activity presented a different set of operational requirements, from scheduling and timing requirements for deliveries to the size and type of goods and vehicles that were required for activities. Different vehicle types were included in the scheme ranging from car-based light EVs (e.g. Nissan Leaf or Renault Kangoo) right up to 18-tonne trucks (e.g. Iveco Eco-daily or Nissan eNV200).

In bringing together a wide-range of stakeholders, the project was able to not only test EVs in real urban situations, but also to investigate and assess the shift in perceptions of operatives ‘on the ground’ whose daily activities were impacted by the trial.
Results

FREVUE findings

Of the industry partners involved in the trial, Heineken and UPS found the results to be so positive that they have since expanded their fleet of EFVs in urban logistics – while others have plans in place to expand their EFV fleets. In terms of perception, the project reports that in 2013, when trials started, only 39% of the participating fleet managers viewed EFVs as positive or comparable to traditionally fuelled vehicles. At the end of the trial, a survey revealed that over 70% of fleet managers considered EFVs to be a viable alternative to traditional fleets. In addition, range anxiety amongst drivers and fleet managers (a widely considered barrier to converting to EVs) decreased over time as participants became familiar with vehicle capabilities. In relation to EFV manufacturers, the trial concluded that visibility and availability of larger capacity EFVs would be of benefit in increasing the uptake of EFVs in urban freight logistics.

In relation to the role and outcomes for local authority participants, the project focused on the social and environmental benefits of increasing EFV uptake. The impacts on air quality, noise pollution, congestion and public safety were all studied and addressed during the project. It is important to note that one of the most common concerns about EVs in urban areas is that of public safety due to these being ‘silent’ vehicles. Over the 4.5-year trial, no safety-related issues were reported. In terms of the impact that local authorities can make on EFV uptake through policy changes, the study concludes that economic measures could include exemptions from congestion and other road or toll charges for EFVs, and parking access restrictions that affect vehicles other than EFVs (e.g. low or zero emission zones, timed access permits, loading and unloading concessions only for EFVs, and allowing EFVs to use previously prohibited lanes such as bus or tram lanes).

Working in parallel with electricity network operators, local planning departments can work towards an increased density and optimal distribution of fast-charging points. The ways EFVs are used and their charging requirements – differ from those for passenger EVs with the majority of charging taking place overnight when parked in a warehouse or depot. As a result, the study concludes that upgrades to grid capacity may be required to help stimulate commercial EFV uptake.
FREVUE recommendations

FREVUE recommends a 4-step plan to improve grid capabilities to accommodate increasing numbers of EFVs in urban areas:

1. Network operators should engage with fleet operators to raise awareness of – and search for solutions to – potential grid constraints;
2. Evaluate the cost versus benefits of capacity increases when this cost could be passed on to the customer;
3. Ensure expanded choice and convenience – an example provided is to encourage smart charging to spread demand and avoid issues at peak times;
4. Develop informed position papers to ensure that stakeholders have access to local policies and guidance relating to EFV charging requirements and grid capabilities.

The study concludes that local government and electricity network providers have a critical role to play in increasing the number of EFVs in use for urban logistics, and that there are diverse and adaptable mechanisms for doing so.

Challenges, opportunities and transferability
The project recognised that the retail price of EFVs was the greatest barrier to their uptake. Although the cost of EFVs differs across Europe, they are costlier than their diesel counterparts (particularly larger EFVs). This can be tackled with policy incentives that do not have to provide grant or subsidies, but can offer a reduction in running costs or by making use of the EFVs more efficient than traditionally fuelled urban logistics vehicles. With the increasing number of Urban Vehicle Access Restrictions being implemented in cities across Europe, EFVs may yet present the most cost-effective route to continued, reliable operations for goods distribution in urban areas. Results from the study also show that user perceptions of EFVs are liable to change as the vehicles become more commonplace – further enhancing uptake.

**In Depth**

FREVUE has published detailed insights into the project’s achievements, conclusions and recommendations. All reports and materials from the FREVUE project can be found on the project website ([https://frevue.eu/reports/](https://frevue.eu/reports/)).

The benefits of using EFVs have also been highlighted in a video clip previously made available through the Eltis website and a news article published in August 2017.

**Keywords**

Urban Freight; freight; FREVUE; Electric Freight Vehicle; EFV

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