FREVUE
FREVUE VALIDATING FREIGHT ELECTRIC VEHICLES IN URBAN EUROPE

Funding: European (7th RTD Framework Programme)
Duration: Mar 2013 - Sep 2017
Status: Complete with results
Total project cost: €14,250,789
EU contribution: €7,999,652

Objectives:

Eight of Europe’s largest cities, will demonstrate that electric vehicles operating “last mile” freight movements in urban centres can offer significant and achievable decarbonisation of the European transport system. Demonstrators will be deployed in Amsterdam, Lisbon, London, Madrid, Milan, Oslo, Rotterdam and Stockholm. The demonstrators have been designed to ensure FREVUE covers the breadth of urban freight applications which occur across Europe. By exposing 127 electric vehicles to the day to day rigours of the urban logistics environment, the project will prove that the current generation of large electric vans and trucks can offer a viable alternative to diesel vehicles - particularly when combined with state of the art urban logistics applications, innovative logistics management software, and with well designed local policy.

The project will demonstrate solutions to the barriers currently inhibiting uptake of EVs in the sector and includes leading European researchers who will design and then implement a common pan-European assessment framework to understand the impacts of these solutions. This will ensure that the project creates a valuable European evidence base on the role of EVs in urban logistics. Partners will produce a detailed White Paper on the feasibility of EV rollout in logistics across Europe, with chapters containing best practice advice on EV in logistics for: policy makers, logistics operators, their customers and companies developing technology to support the sector.

The final overarching objective is to encourage the exploitation of these best practice results through a targeted dissemination campaign aimed at decision makers in the logistics industry. To complement this, FREVUE will also create a network of “Phase 2” cities to directly share the lessons learned from the demonstrators. These cities are expected to be the first cities to expand the successful concepts developed by FR-EVUE.

Methodology:

FREVUE was broken down into five work packages:

WP1 Assessment and ICT Framework: Data protocols, data handling procedures and an assessment framework for the demonstrators were developed. In addition, a state-of the art logistics review ensured that the lessons learnt from previous projects were taken into consideration in the planning phase of the demonstrators.

WP2 Demonstrators: The electric freight vehicles, charging infrastructure and ICT management systems were deployed under real-world logistics conditions. The local authorities and industry partners also established cooperation and management principles to run the different trials and specific working groups were established to share experiences and lessons learnt between the different demonstrations.

WP3 Analysis: The data from the demonstrators was evaluated and relevant conclusions for the different key stakeholders identified were drawn according to five thematic areas:

• Technical suitability of EVs for logistics
• Economics of EVs for city logistics
• Systemic transport and environmental impact of EFVs for logistics
• Attitudinal and social impact of EVs for logistics
• Institutional conditions from the different demonstration sites including relevant policies, procurement and governance mechanisms

The lessons learnt in each of the assessment areas served to produce targeted guidelines and recommendations on the potential to electrify logistics and freight delivery activities across European cities.

Parent Programmes:
FP7-TRANSPORT - Transport (Including Aeronautics) - Horizontal activities for implementation of the transport programme (TPT)

Institute type: Public institution
Institute name: The European Commission
Funding type: Public (EU)

Partners:
GEMEENTE AMSTERDAM - Netherlands
STOCKHOLMS STAD - Sweden
OSLO KOMMUNE - Norway
AYUNTAMIENTO DE MADRID - Spain
EMEL - EMPRESA PUBLICA MUNICIPAL DE ESTACIONAMENTO DE LISBOA, E.E.M. - Portugal
COMUNE DI MILANO - Italy
HEINEKEN NEDERLANDS BEHEER BV - Netherlands
TNT EXPRESS NEDERLAND BV - Netherlands
UPS LIMITED - United Kingdom
SEUR SA - Spain
CTT CORREIOS DE PORTUGAL SA - Portugal
BRING EXPRESS NORGE AS - Norway
Grupo Leche Pascual - Spain
UK POWER NETWORKS (OPERATIONS) LTD - United Kingdom
FORTUM POWER AND HEAT AB - Sweden
OVE ARUP & PARTNERS INTERNATIONAL LIMITED - United Kingdom
SMITH ELECTRIC VEHICLES EUROPE LIMITED - United Kingdom
Nissan International SA - Switzerland
INSTITUTO TECNOLOGICO DEL EMBALAJE, TRANSPORTE Y LOGISTICA - Spain
IMPERIAL COLLEGE OF SCIENCE TECHNOLOGY AND MEDICINE - United Kingdom
STIFTELSN SINTEF - Norway
NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO - Netherlands
HYDROGEN, FUEL CELLS AND ELECTRO-MOBILITY IN EUROPEAN REGIONS - Belgium
POLIS - PROMOTION OF OPERATIONAL LINKS WITH INTEGRATED SERVICES, ASSOCIATION INTERNATIONALE - Belgium
**Key Results:**

The analysis and evaluation of the FREVUE demonstrators provided evidence on the impact electric freight vehicles have in city logistics operations, including:

**Technical suitability of Electric Freight Vehicles (EFVs) for logistics:**

- Battery performance in real traffic conditions and different environments
- Efficacy and impact of the different charging systems
- Adequacy of charge point density and layout
- Impact of EV charging systems on the local grid
- Practical issues with vehicle operation and maintenance
- Performance of advanced route optimization algorithms for EFVs
- Delivery efficiency and success rate

**Economics of EVs for city logistics**

- Financial and social cost benefit appraisal for operators and network managers
- Operators future purchase/acquisition intentions and willingness to pay
- Requirements for future business case development
- Leasing and ownership models

**Systemic Transport and Environmental impact of EVs for logistics**

- Impacts on network congestion as a result of EFV based consolidation centers
- Impacts on air quality caused by the reduction or elimination of tailpipe emissions
- Impacts on both local CO2 emission and on total CO2 environmental load, taking account of the nature of electricity generation
- Impacts on the safety of road users
- Impacts on noise nuisance for residents, workers and other users
- Performance and enforcement of systems to give EVs priority in the street network

**Attitudinal and social impact of EVs for logistics**

- Response and acceptance of operators to new EV and ITS processes, systems and interfaces and requirements for system enhancements
- Drivers charging behaviour
- Changes in driver’s network routing and driving styles
- Changes in driver’s loading/unloading behaviour
- Impacts on receiver and customer perceived level of service
- Analysis of incidence and distribution of positive and negative attitudinal impacts and effects on different groups (e.g., operators, customers, network managers, general public etc.)

**Institutional conditions from the different demonstration sites including relevant policies, procurement and governance mechanisms**

- What contextual conditions are favourable/unfavourable for EFVs usage/uptake?
- What are the main experiences from the cooperation between the different stakeholders?
- What are the main policies public authorities could implement to support the uptake of EFVs?
Transport

**STRIA Roadmaps:** electrification

**Transport mode:** Road transport

**Transport sectors:** Freight transport

**Transport policies:** Environmental/Emissions aspects, Decarbonisation

**Geo-spatial type:** Urban