



From assessment framework to evaluation

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FREVUE

Validating FReight Electric Vehicles in Urban Europe

FREVUE (www.frevue.eu) demonstrates the use of electric vehicles for goods delivery with **potential to reduce environmental impacts**

in **8 European cities** of different sizes from north to south, involving Amsterdam, Lisbon, London, Madrid, Milan, Oslo, Rotterdam, and Stockholm.

2013 – 2017 (4 ½ years)

- 30 partners from public, private and research sectors
- Total budget: € 13.8 million
- Coordinator: Westminster City Council / Cross River Partnership.



FREVUE demo cities



Stockholm

New development areas



Oslo

BRING: Winter + compare EVs to fossil fuel



Lisbon

EMEL: EVs in historical area.



Madrid

Itene, SEUR, Pascual, TNT:
ITS for EV logistics



Rotterdam/Amsterdam

HEINEKEN: Test large EVs in beverage distribution
TNT Express, UPS: All electric parcel distribution centres.



Milan

Consolidated EV logistics for
pharmaceutical deliveries



London

Reduce charging constraints for medium-
large EV fleets, expand EV consolidation
centre.

FREVUE Consortium



Co-ordination and Dissemination

Hyer, Polis

City + Policy

Westminster

City of Amsterdam

City of Lisbon

City of Madrid

City of Milan

City of Oslo

City of Rotterdam

City of Stockholm

EMEL

Transport for London

Swedish Transport Adm.

Logistics



Research

Imperial College London

TNO (NL)

SINTEF (NO)

ICT Partners



Vehicle Manufacturers



Renault will also support the project

Grid Operators



FREVUE Demos include:

- 120 vehicles: 3.5 -18 tonne
- Different sectors: Food, retail, waste, post
- Different logistic models: Consolidation centres, point to point deliveries etc.
- Public & Private organisations: Local freight operators through to multi-national logistic companies
- Different charging modes: fast, time-shifted, dynamic response etc.



FREVUE Central Assessment Framework

5 assessment themes & methods

- Monitoring
- Experience surveys
- Business Model Analysis
- Impacts modelling
- Process evaluation

The idea is to benchmark electric freight vehicles against fossil fuel vehicles and to evaluate the effects.

Technical performance of EVs & charging infrastructure

Vehicle & battery activity, maintenance and repair
Charging activity, charging availability, grid impacts

Economic evaluation, logistics

Cost Benefit Analysis, business case development
Purchase intentions, willingness to pay, leasing /ownership models

Systemic & environmental effects

Local air quality, CO₂ emissions, safety, noise, congestion
Priority and enforcement

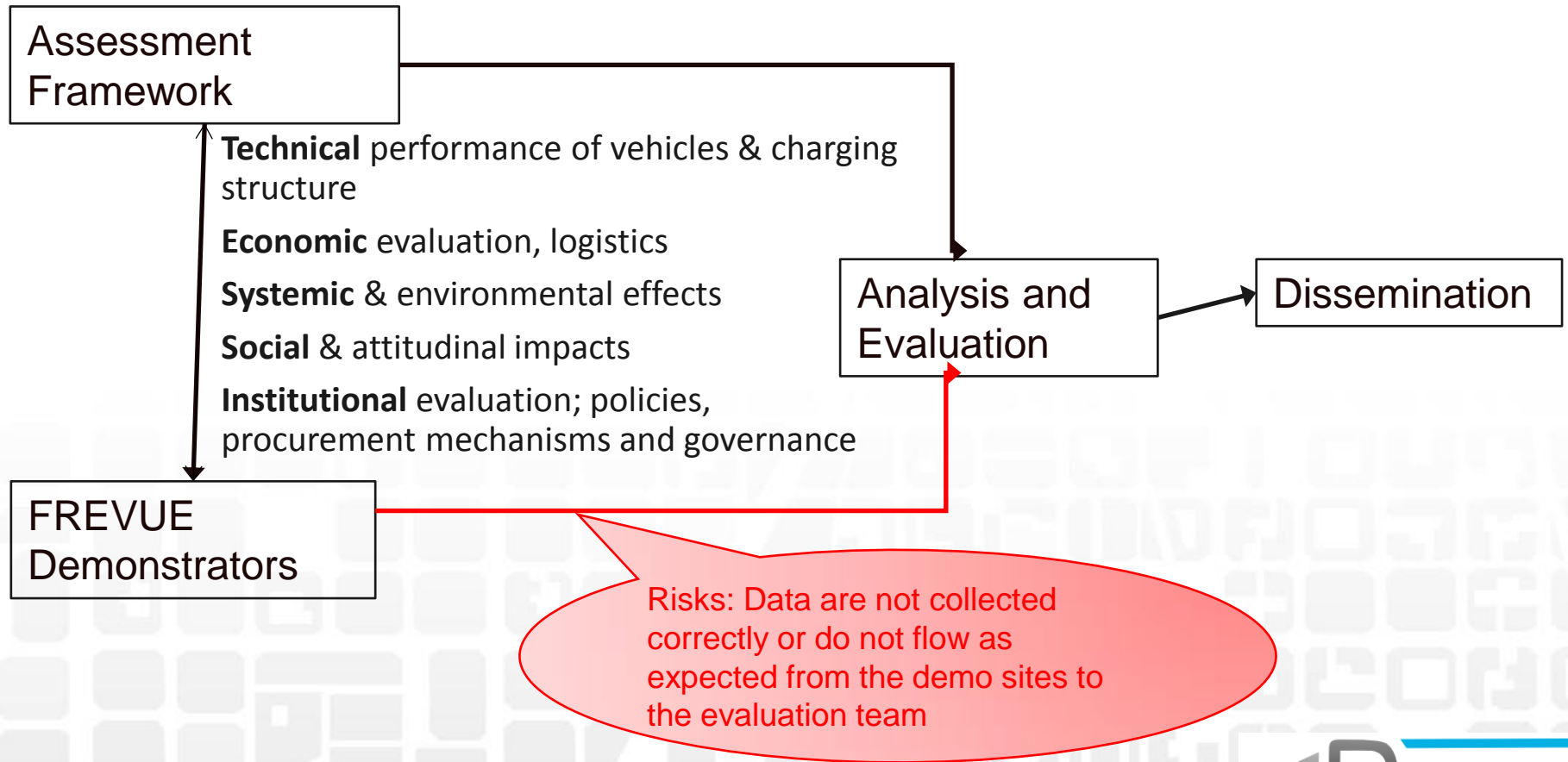
Social & attitudinal impacts

User acceptance of EVs and ITS systems
Changes in driving styles, un-/loading behaviour, perceived quality of service

Institutional evaluation; policies, procurement mechanisms and governance

Influence of public policy; procurement, governance, new stakeholder relationships

FREVUE Evaluation Structure



Challenges in data collection

- **To reach the "right" person** in each organisation to provide useful response: Number of actors, communication lines, culture, language.
- **Provide electric vehicles:** Limited range of models, retailers and maintenance providers, delivery time, economic uncertainties, lengthy municipal processes, differences in governmental subsidies and regulations.
- **Data capture for monitoring** EVs & charging activity is a basis for several assessment themes: Range of models and manufacturers, retailers, operators, nations - business competition, non-disclosure agreements, privacy issues.

FREVUE data collection strategies

Strategies to reach the "right" person

- Each FREVUE demo: Responsible demo manager and data collection manager
- Research partners communicate directly with demos and partners
- Routines to monitor data collection for each theme and demo site

Strategies for data capture for technical assessment

- Establish operators ability to export data
 - Search for data sources for each vehicle: Fleet management systems, back office systems, external logging equipment (suppliers, local support), hand terminals.
 - Identify technical expert (operator, EV supplier) and legally responsible for data transfer accept
 - Extract sample data, identify links between data sources
- Define data transfer & collection governance
 - Establish data transfer routines (who, what, how, when)
 - Extract, transform and load data
 - Check data (Exploratory Data Analysis) and set up feedback routines

FREVUE from assessment framework to evaluation

Still on the way

- FREVUE demos in different stages of implementation
- Data collection has started



Lessons learned so far

- Insight into EVs for company fleets and freight transport
- Big data: Technology yes, but person-to-person & communication lines essential



Will eventually provide

- Data for different freight EV sizes and models, goods and logistics models, seasons, climates, measures
- Evaluation of effects
- Improve knowledge base for operators and cities to take informed decisions considering site specific challenges and measures

Thank you for your attention!

www.frevue.eu

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