Cleaner mobility solutions: "last mile delivery" in Europe

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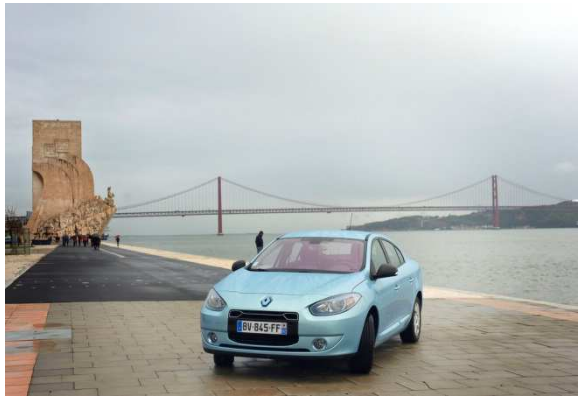
Last Mile Freight Delivery: Use of Cleaner Mobility Vehicles



OUR TEAM

University of Lisbon

Vehicle Simulation and Energy Sources

Energy impacts, Behavior and electric mobility

City Logistics and Urban Freight Transport

Urban Accessibility

User/Technology Interaction

Research areas

Sandra Melo

Last mile delivery, Freight Transport and Traffic simulation

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Electric mobility monitoring and impacts, LCA Fleet impacts, Policy implications

Coordinator:
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Sustainable transports, Urban Mobility Management

Introduction

What is the current situation?

Energy, emissions, traffic and system efficiency in urban centers are affected by

Urban logistics (last mile delivery)

Almost 100% of goods transport within cities is done by motorized vehicles

WHITE PAPER on TRANSPORTS

Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system

Ten Goals for a competitive and resource efficient transport system: benchmarks for achieving the **60% GHG emission** reduction target

Goal #1:Developing and deploying new and sustainable fuels and propulsion systems

Halve the use of 'conventionally-fuelled' cars in urban transport by 2030; phase them out in cities by 2050; **achieve essentially CO_2-free city logistics in major urban centres by 2030**.

http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0144:FIN:EN:PDF

European applications of EV on last mile delivery

Energy, emissions, traffic and system efficiency in urban centers are affected by

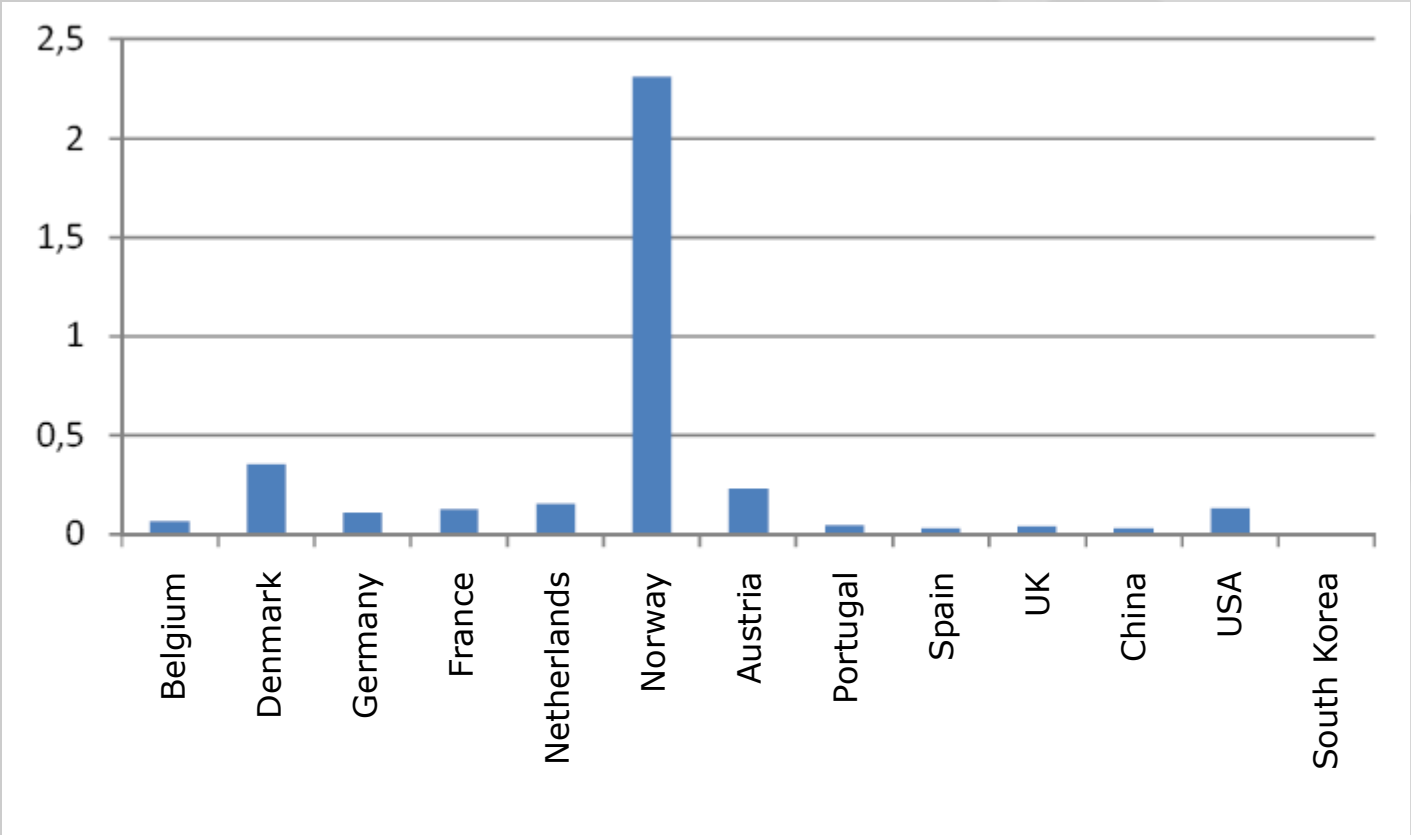
Urban logistics (last mile delivery)

Problems addressed by

- **Introduction of cleaner solutions**
- **Adoption of more flexible and smaller solutions**
- **Parking and delivery policies**
- Micro-platforms
- Others

European applications of EV on last mile delivery

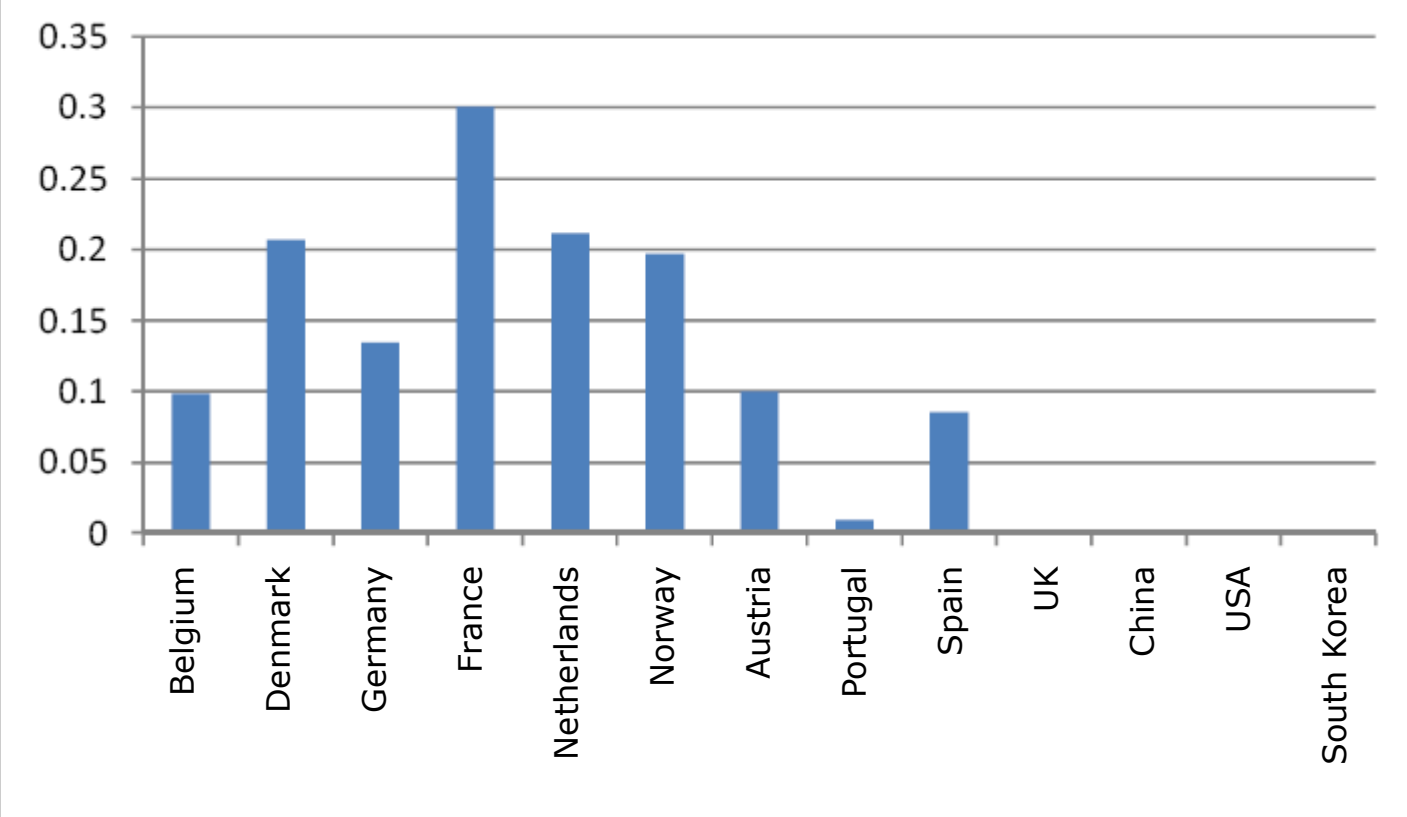
Number of electric cars per 1000 passenger cars (2012)



Adapted from Weeda, M., P. Kroon and D. Appels (2012) Elektrisch vervoer in Nederland in internationaal perspectief, ECN/Agentschap NL, Petten

European applications of EV on last mile delivery

Number of electric goods vehicles per 1,000 freight vehicles (2012)



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European applications of EV on last mile delivery

TÉCNICO LISBOA

EVs are starting to be available for last mile delivery

idmec IST engenharia mecânica

Energy, emissions, traffic and system efficiency in urban centers are affected by

Urban logistics (last mile delivery)

Light goods are often transported over very short distances by HDV. Every second trip in urban areas is shorter than 5 km and could easily be done by bike.

Small sizing of vehicles -> 25% potential of all trips that could be shifted from motorized vehicles towards cycling-related solutions.

- Less energy consumption and CO_2 emissions
- Reduction in congestion, noise levels and pollution
- Increase in space for citizens
- Increase in the quality of urban life.

What is being done in Europe?

EU projects involving urban freight delivery

European projects: ELCIDIS

ELCIDIS: ELECTRIC VEHICLE CITY DISTRIBUTION SYSTEMS (1998-2002)

The ELCIDIS project tested a better solution for urban logistics by:

- Organizing urban distribution using quiet and clean (hybrid) electric vehicles
- A more efficient organization of urban logistics by more efficient routing of the vehicles and the use of urban distribution centers (UDC).

Site	Logistics		Vehicles		
	Distribution service	Operating area	Number & type	Battery type	Payload in kg
Rotterdam	parcels & packages	city centre	3 electric vans Mercedes Sprint	6 x sodium nickel chloride ZEBRA Z5C	1250
			4 electric vans Mercedes Sprint	12 x sodium nickel chloride ZEBRA Z5C	1000-1500*
Stockholm	delivery of goods such as parcels, packages, food and clothes	city centre & region	6 hybrid electric trucks Mercedes ATEGO 1217	6 x lead	2300
			3 electric vans Citroën Berlingo	3 x nickel cadmium	440
La Rochelle	parcels, packages & messages	city centre	6 electric vans Citroën Berlingo	6 x nickel cadmium	500
			1 FAAM Jolly 1200 electric van	1 x lead	900
			1 electric car Citroën Saxo	1 x nickel cadmium	300
Erlangen	delivery service of goods & documents	city centre & region	10 hybrid electric Audi Duo	10 x lead	400
Regione Lombardia	mail delivery & services	city & city centre	13 electric vans Citroën Berlingo	13 x nickel cadmium	500
Stavanger	mail, packages, documents & equipment etc.	city centre & region	3 electric vans Peugeot Partner	3 x nickel cadmium	500
			2 electric vans Citroën Berlingo	2 x nickel cadmium	500
			2 electric cars Citroën Saxo	2 x nickel cadmium	300
			1 electric van Mercedes Sprint	1 x lead	500**

* If more than 1000 kg, Gross Vehicle Weight exceeds 3500 kg, meaning the van becomes a truck.
** With a Gross Vehicle Weight of 3500 kg.

European projects: CIVITAS

CIVITAS: 15 projects on urban mobility (2002-2016)

CIVITAS works on 9 areas but the area of urban freight logistics it encourages:

- The use of cleaner freight vehicles
- Solutions to better coordinate freight logistics

More efficient freight deliveries can reduce congestion, lower emissions and free up space for sustainable modes.

Compare measures:
http://www.civitas-initiative.org/thematic-categories/urban-freight-logistics

European projects: BESTFACT

BestFact: Best Practice Factory for Freight Transport (2012-2015)

BESTFACT
Best Practice Factory for Freight Transport

Objective: develop, disseminate and enhance the utilization of best practices and innovations in freight transport

Areas of action:

- **Urban Freight**
- **Green Logistics & Co-modality**
- **eFreight**

European projects: Cyclelogistics

Cyclelogistics - Moving Goods by Cycle (2011- 2014)

11 countries

Objective: aims to reduce energy used in urban freight transport by **replacing unnecessary motorized vehicles with cargo bikes for intra-urban delivery and goods transport in Europe**

http://www.cyclelogistics.eu/

European projects: Cyclelogistics

cyclelogistics
moving Europe forward

Cyclelogistics - Moving Goods by Cycle (2011- 2014)

Focus Groups

Living Laboratory

Shop by bike

Vrachtfiets

Goods Delivery

Consumer Tests

European projects: STRAIGHTSOL

City Logistics project

STRAIGHTSOL **http://www.straightsol.eu/**

Strategies and measures for smarter urban freight solutions (2012-2014)

European projects: E-Mobility NSR

E-Mobility NSR: North Sea Electric Mobility Network (2011-2014)

Objectives:

- Provide **state of the art information** which may help policy development in e-mobility in the NSR.
- Provide insight into the **gaps and needs in respect of infrastructure, logistics and preliminary standards** for multi charging techniques.
- **Long-term analysis** upon which regional and local governments as well as other relevant stakeholders in the NSR may engage on e-mobility.

www.e-mobility-nsr.eu

Beneficiaries per Country

United Kingdom
Transport for London
Newcastle City Council
Northumbria University
Cities Institute
Hertfordshire County Council

The Netherlands
Municipality of Amsterdam
Delft University of Technology
Province of North Holland

Germany
Hamburg University of Applied Sciences
WFB Wirtschaftsförderung Bremen GmbH

Denmark
FDT - Association of Danish Transport and Logistics Centres
Høje-Taastrup Kommune

Sweden
Lindholmen Science Park AB

Norway
Zero Emission Resource Organisation

Belgium
Ghent University

European projects: ENCLOSE

City Logistics project

ENCLOSE - ENergy efficiency in City LOgistics Services for small and mid-sized European Historic Towns

(2012-2014)

www.enclose.eu

Start: May 2012

Duration: 30 months

Coordination: MemEx Srl, Livorno (Italia)

Consortium: 16 partners from 13 EU countries

European projects: ENCLOSE

City Logistics project

ENCLOSE - ENergy efficiency in City LOgistics Services for small and mid-sized European Historic Towns

(2012-2014) Almada City

Survey
700 shops
+ 30 cardrivers
+ 20 logistic companies

European projects: FREVUE

City Logistics project

FREVUE Demonstration of Urban Freight Electric Vehicles for Clean City Logistics (March 2013 – 2017)

DG Research FP7

http://frevue.eu/

European projects: DOROTHY

DOROTHY: Development Of RegiOnal clusTers for researcH and implementation of **environmental friendlY urban logistics** (2013-2015)

Regions: **Tuscany, Comunidad Valenciana, Lisboa e Vale do Tejo Region, Oltenia Region**

- Definition of a **Joint Action Plan** (JAP) for RTD and innovation in Regions
- Identification of the **innovation measures** and assessing of technological, implementation and benefit framework
- Mentoring of new **clusters** and measures towards the implementation of the Joint Action Plan

What else is being done in Europe?

Practical Applications of *EV & bikes* in Last mile delivery

European applications on last mile delivery

Analysis of case applications in:

- **Denmark (10)**
- **Norway (2)**
- **Germany (9)**
- **UK (11)**
- **The Netherlands (13)**
- **Belgium (10)**
- **Sweden (3)**

Considering:

- Status
- Number and type of vehicle
- Type of application
- Funding
- Impacts
- Operation

Main source of information: *E-Mobility NSR Comparative Analysis of European Examples of Schemes for Freight Electric Vehicles Compilation report, TU Delft, HAW Hamburg, Lindholmen Science Park, Aalborg, Denmark*

European applications on last mile delivery

Austria

- ☐ Window Cleaner (Vienna)
- ☐ Food Delivery (Graz)
- ☐ Advertisement distributors
- ☐ Mail services (Graz)
- ☐ Bike messengers (urgent orders)

Bulgaria

- ☐ Festivals
- ☐ High School Proms
- ☐ Putting up posters
- ☐ Courier

European applications on last mile delivery

Denmark

☐ All sorts of goods transport

☐ Street vendors (ice cream, coffee, pancakes, cocktails, snacks, soup, sandwiches, sushi)

☐ Deliveries (post; packages)

☐ Shopping; supermarkets

☐ People - parents transporting children

to day care centres

Italy

☐ private mail and small packages delivery

☐ waste collection (re-launched by creation of pedestrian areas)

☐ child/children

☐ municipal police (pedestrian areas)

European applications on last mile delivery

Romania

- ☐ delivery of refreshments such as hot dogs & coffee
- ☐ waste paper collection
- ☐ advertising
- ☐ courier services

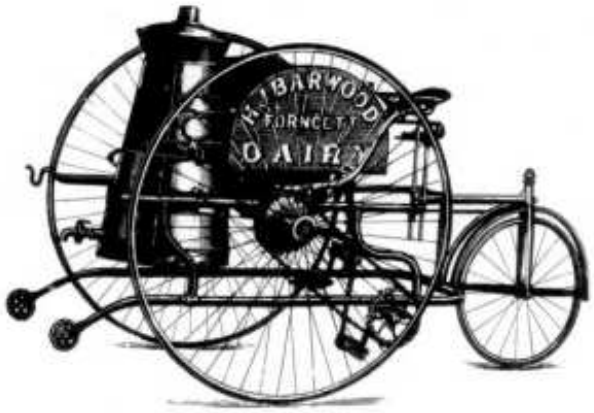
Safety/security is an issue

New York

- ☐ Mostly food delivery;

Temperature is an issue

What are we doing?



Rear-steering milk tricycle – 1885

Monarch carrier – rated best on the market in 1889

- 1881: first carrier cycle was used by the British Post Office
- A few decades later, many shopkeepers used this type of bike to make local deliveries of bread, meat, milk etc.

The past?

- Thomas Edison was about to invent the light bulb
- The Statue of Liberty was about to be made in France and shipped to New York
- The Eiffel Tower didn't exist yet

The present

Various models, able to transport up to 500 kilograms, and varying in price from 800 to 6000 euros, can be found on the market

What are the main barriers?

Main barriers (Europe)

- The biggest problem seems to be (mis)perception: safety, security and theft of both cycles and payload *(source: Transport for London)*
- Technology (availability, cost, reliability/trust,…)
- Diesel Culture
- And for bicycles / cargo bikes
  - Driver fatigue
  - Range (4 or 7 km)
  - Topography
  - Weather (seasonality)

How are we addressing the challenges?

Research questions

1) How does the use of CMS´s affects traffic, energy efficiency and emissions?

2) What should be the geographical coverage of CMS's replacing conventional vehicles on city logistics?

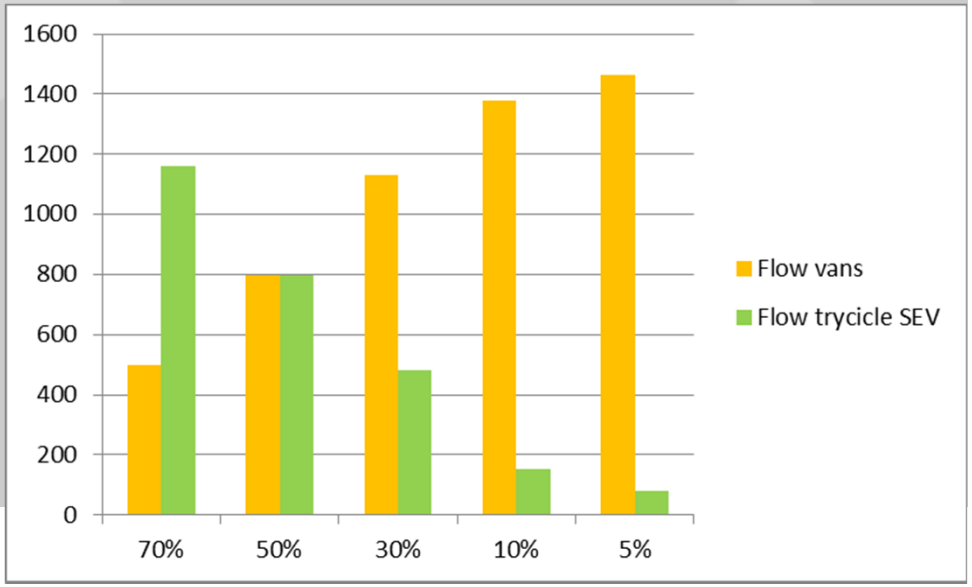
3) What is the appropriate business model, the adequate incentives and policies?

4) How do these solutions behave in real world conditions?

Research questions

1) How does the use of CMS´s affects traffic, energy efficiency and emissions?
2) What should be the geographical coverage of CMS´s replacing diesel vans on city logistics?
3) What is the appropriate business model, the adequate incentives and policies?

Macro-simulation of traffic impacts of the introduction of small electric vehicles in Oporto



Research questions

4) How do these solutions behave in real world conditions?

On road monitoring of electric vehicles and electric bicycles (over 200km monitoring in Lisbon)

Dynamics, energy consumption of vehicle (and biker)

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