

How to cope with challenges in integrating electric vehicles into city logistics: What can we learn from FREVUE?

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towards zero emission
deliveries at your doorstep



1. Introduction zero emission city logistics

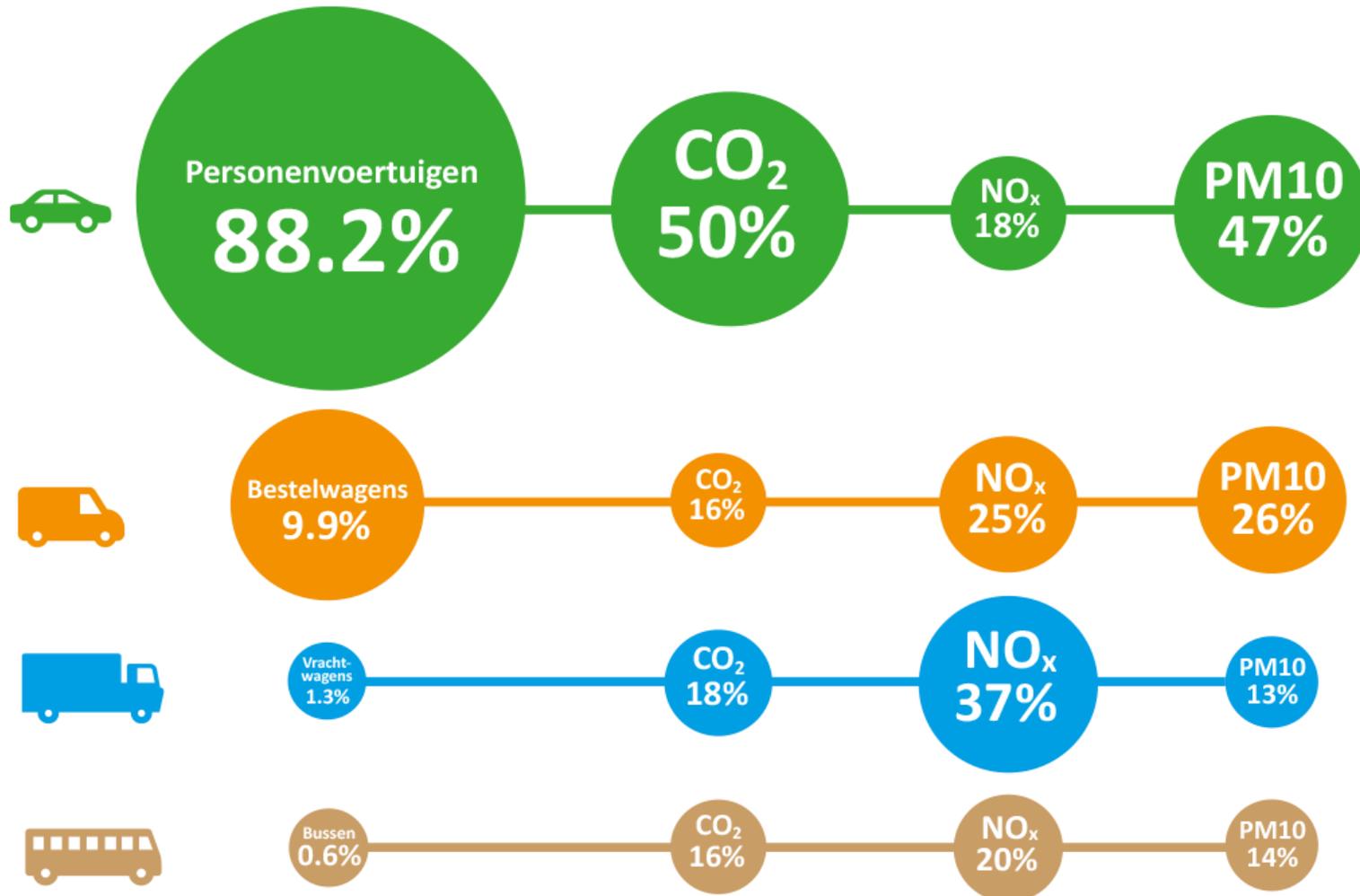
- › Air quality is urgent problem in cities and CO₂ reduction will be
 - › Ambition European Commission: zero emission urban logistics in 2030
 - › Ambition in Green Deal Zero Emission City logistics (GDZES) in the Netherlands
 - › Paris climate agreement

- › The logistics industry is a significant driver of economic growth and essential for sustaining the urbanized way of living, but is also a heavy contributor to unsustainable impacts, such as:
 - › Polluted emissions, nuisance, decrease in traffic safety and accessibility

- › The uptake of EFVs in the logistics industry does not go easily

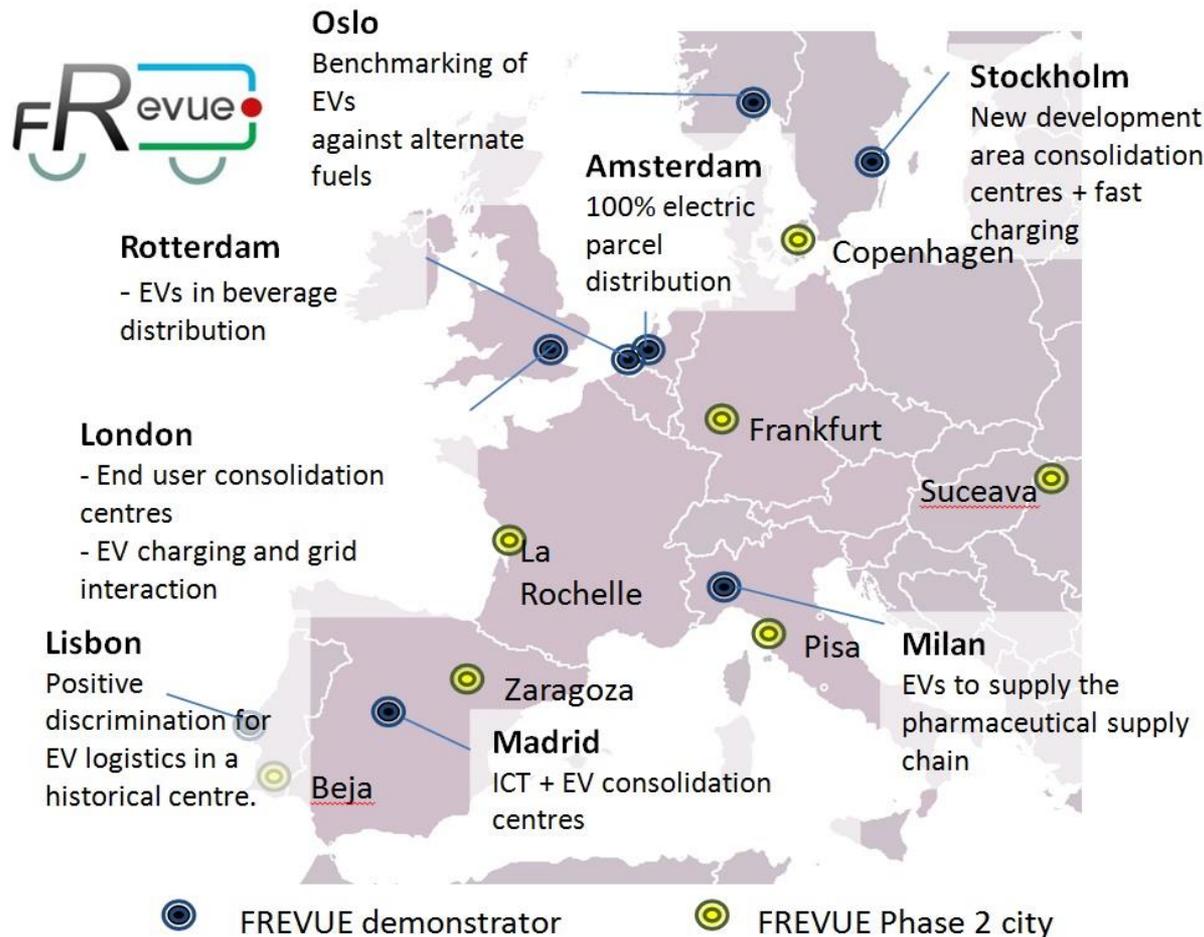
1. Urban freight transport

Total emissions city traffic in Rotterdam



2. Introduction FREVUE

Demonstrating electric freight vehicles in city logistics operations



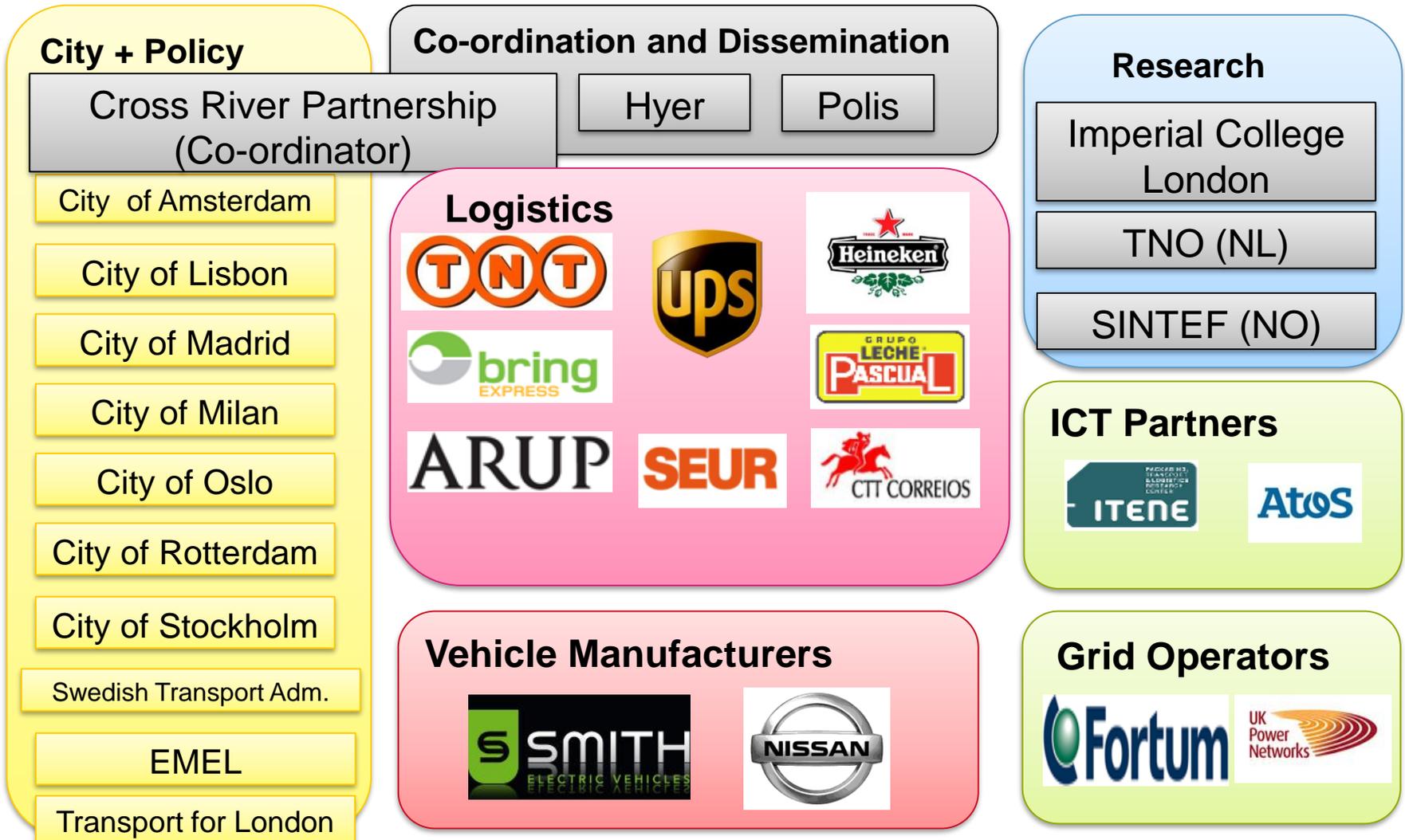
FREVUE demonstrates to industry, consumers and policy makers, how electric freight vehicles can provide a solution to air and noise emissions caused by the logistics industry in urban areas

2. Introduction FREVUE

- **8 locations across Europe:** Amsterdam, Lisbon, London, Madrid, Milan, Oslo, Rotterdam and Stockholm
- **80+ electric freight vehicles**
- **€14.2 million total investment (FP7)**
- **Freight applications** include a wide range of:
 - Goods deliveries
 - Innovative logistics systems and ICT
 - Test of different vehicle types
 - Diverse climate conditions



2. Introduction FREVUE: the consortium



3. Challenge: towards zero emission city logistics

- › One big challenge that cities or logistics operators can not solve by themselves



- › **Manufacturers (OEMs):**

“No demand for electric freight vehicles, so not produced on larger scale”

- › **Logistics operators**

“No electric freight vehicles offered for feasible price”

3. Available electric freight vehicles

< 3.5 ton OEM: e.g. Nissan eNV200, Renault Kangoo ZE)

Renault Kangoo ZE



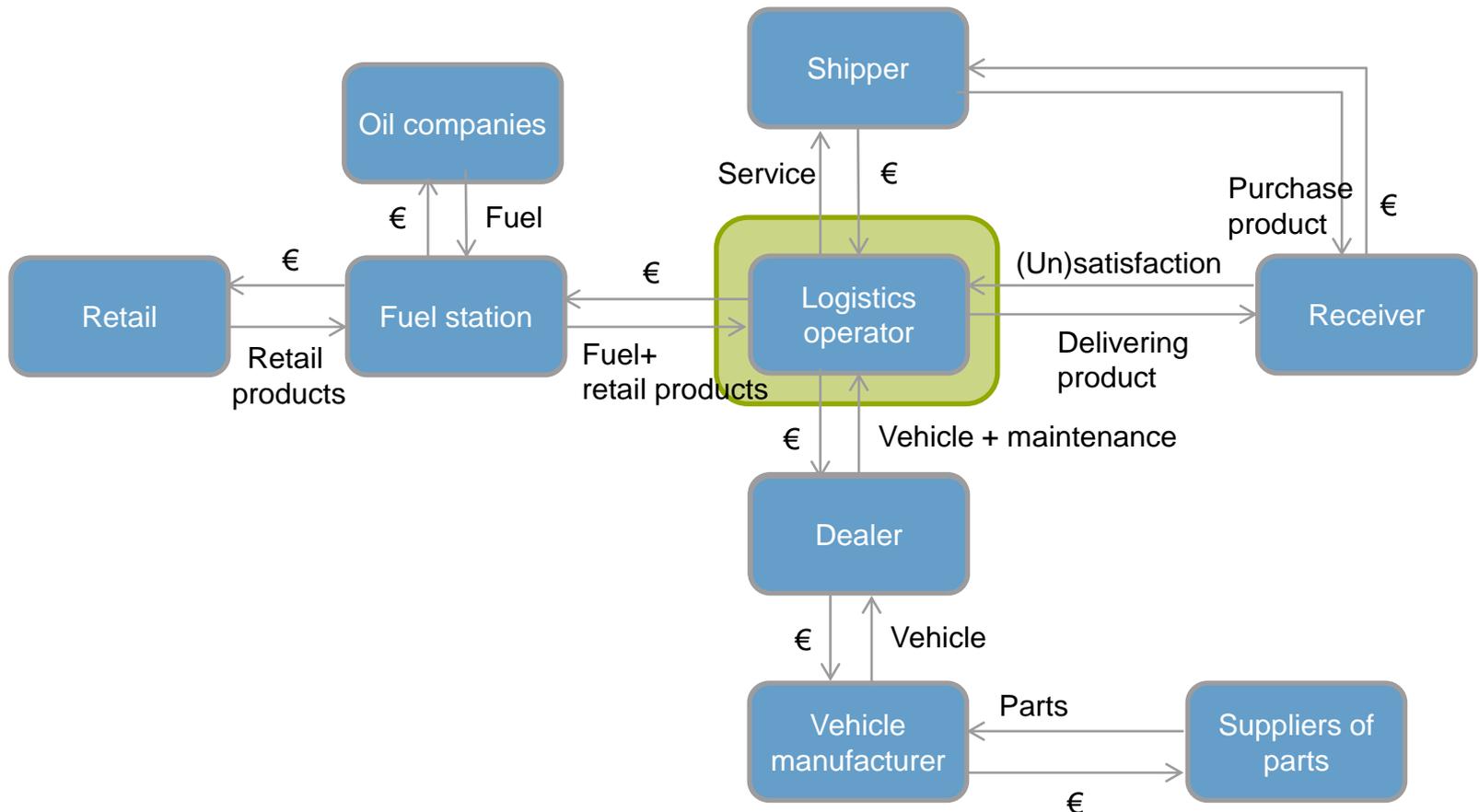
3.5 ton – 12 ton: retrofit, (e.g. Innamo e-Ducato), OEMs (will) start production



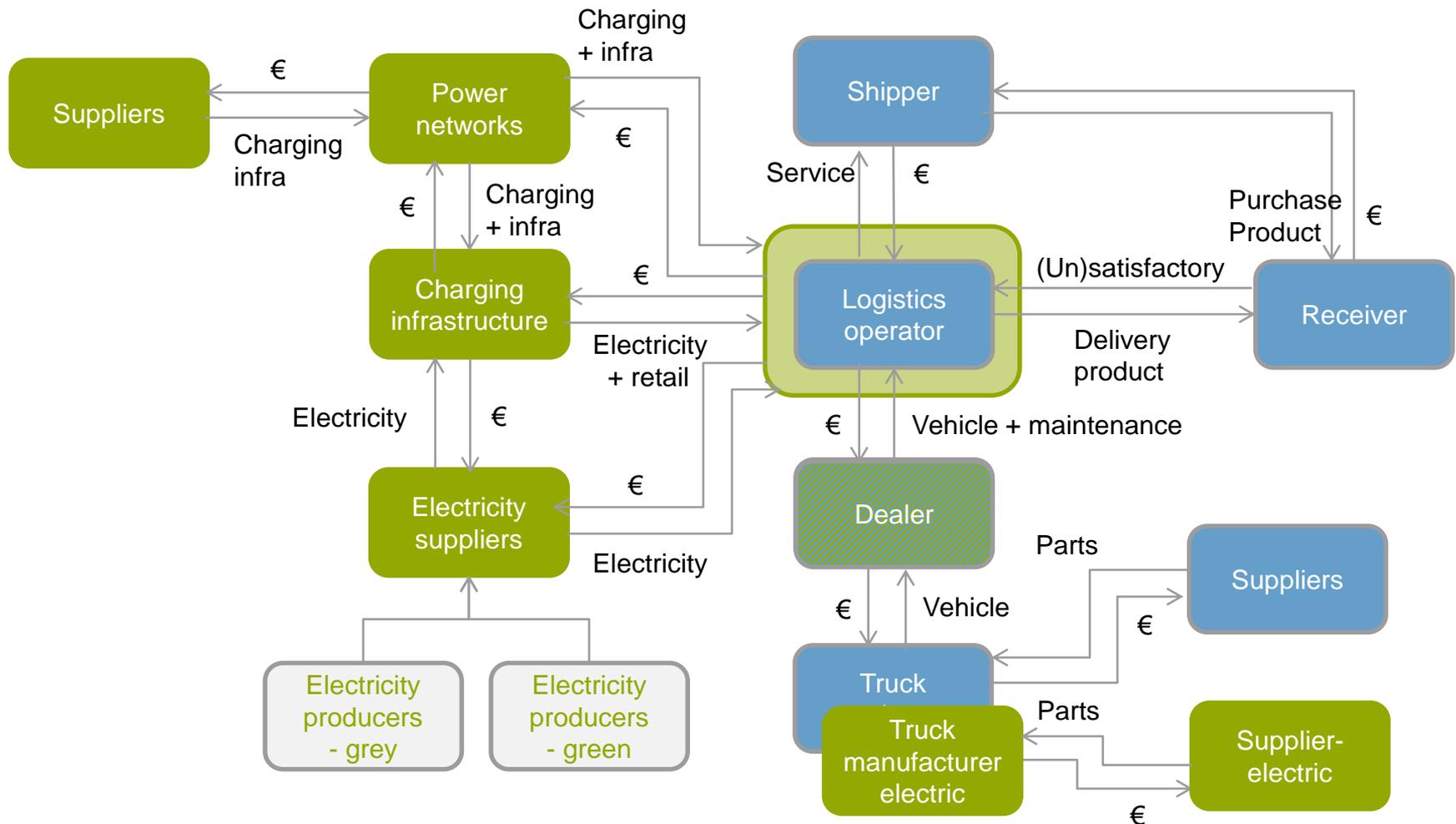
> 12 ton: retrofit (e.g. EMOSS, Ginaf)



3. CURRENT SITUATION (ICE VEHICLES USED FOR CITY LOGISTICS)



3. ZERO EMISSION SITUATION (EFVS USED FOR CITY LOGISTICS)



What changes for freight vehicles?

Purchase price higher for large vehicles up to 2.5 times.

Operating costs lower (diesel vs electricity)

Charging infrastructure required

Costs:

Concluding in revenues:

with purchase

No extra revenues

Decrease maintenance structure

Value proposition

Im

No tangible value added for customer
Value for society: fewer emissions and less nuisance

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What changes for logistics operators using a small and medium size vehicle?

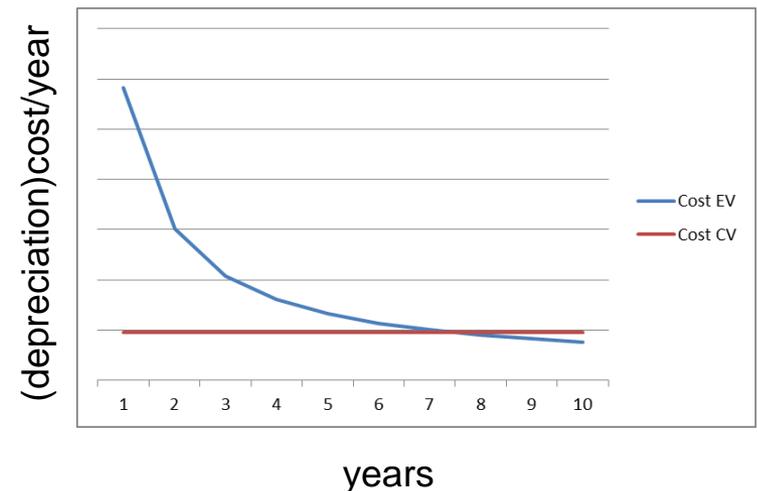
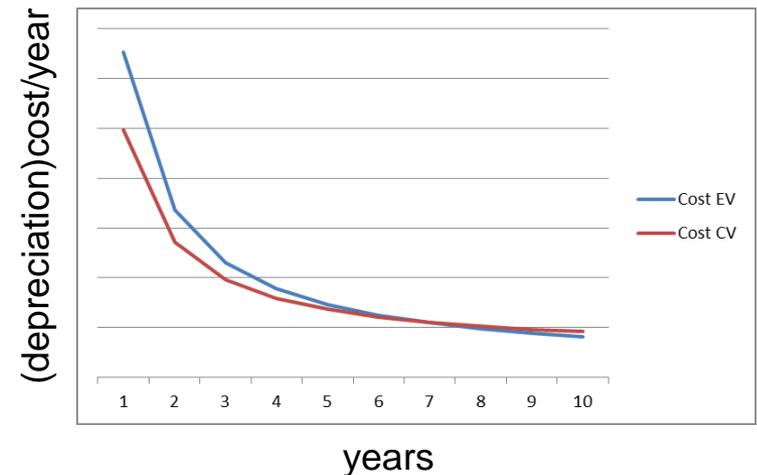
› TCO - example

(*including* purchase subsidy)

Context determines local differences:

- Kilometers
- Tax / congestion charge
- Subsidy
- Residual value and battery depreciation
- Operations performed

**Positive business case is possible
within 6 years (small)
within 8 years (medium)**



What changes for logistics operators using a large size vehicle?

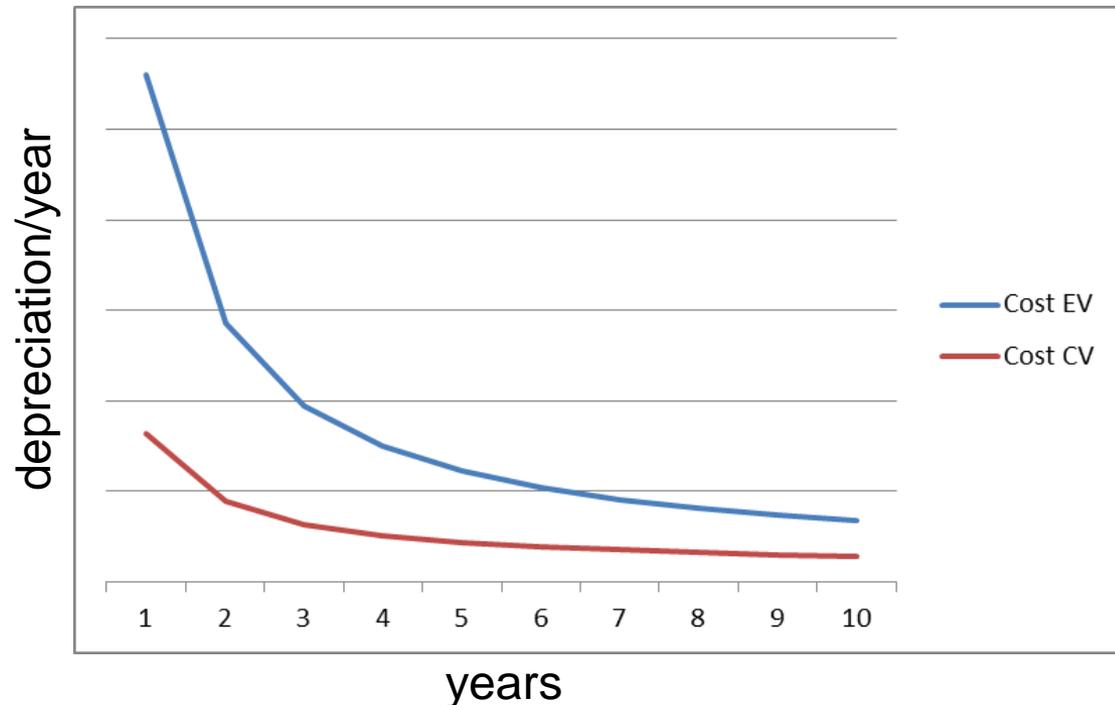
› TCO - example

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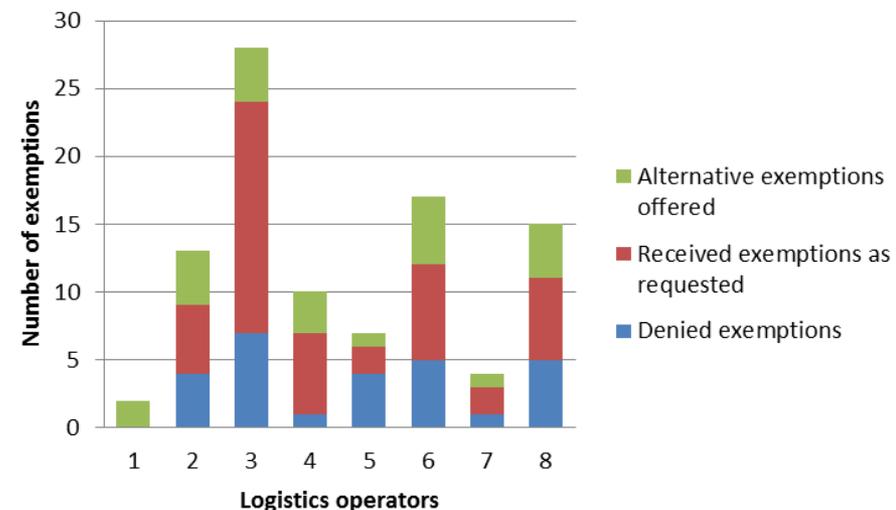
- Kilometers
- Tax / congestion charge
- Subsidy
- Residual value and battery depreciation
- Operations performed

**No feasible business case (yet)
is possible within 10 years**



First results of exemptions in AMSTERDAM

- › Amsterdam provides several incentives to make the business case for zero emission more feasible: subsidy, exemptions, public procurement
- › Exemptions are free of charge
- › Not all exemptions were provided



First results of exemptions EFFECTS

› Time savings

Reduction in walking time and distance drivers – (varying from 15-30 min per day to about 45 minutes), making more drops possible in roundtrip

Less heavy for delivery man

Less time necessary looking for an empty unloading bay / empty parking spot

› Reduction in stress resulting in fewer mistakes

Less illegal parking and as a result:

- › Fewer fines
- › Fewer discussions with enforcement officers and other traffic participants
- › More relaxed working (no fines, discussions and honking)

5. Concluding ...

- › Chicken and egg problem... current market situation

- › *Not just replacing* vehicles (electric instead of diesel) more is required for feasible business case:
 - New network and new partners needed for logistics companies
 - Paradox: high initial costs (vehicle and charging infrastructure), lower operational costs (fuel vs. electricity, policy privileges), *but* making many kilometers is difficult on battery (range)
 - Current logistics system designed for characteristics diesel vehicles and limited range requires other logistics organization
 - (Almost) no extra revenues for more sustainable transport
 - Public procurement for EFV can provide extra revenues
 - Policy privileges can help

Thanks for your attention

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For more information:

- FREVUE Deliverable 1-3 addendum 1 'State of the art of the electric freight vehicles implementation in city logistics - Update 2015' (<http://frevue.eu/category/about-us/public-documents/>)
- Quak, H.J., N. Nesterova, and T. van Rooijen (2016). Possibilities and barriers for using electric-powered vehicles in city logistics practice, Transportation Research Procedia, Volume 12, 2016, Pages 157–169, Tenth International Conference on City Logistics 17-19 June 2015, Tenerife, Spain