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What is the Role for Electric Freight Vehicles in Urban Logistics

The Chartered Institute of Logistics and Transport
16 May 2018
Tanja Dalle-Muenchmeyer, Cross River Partnership

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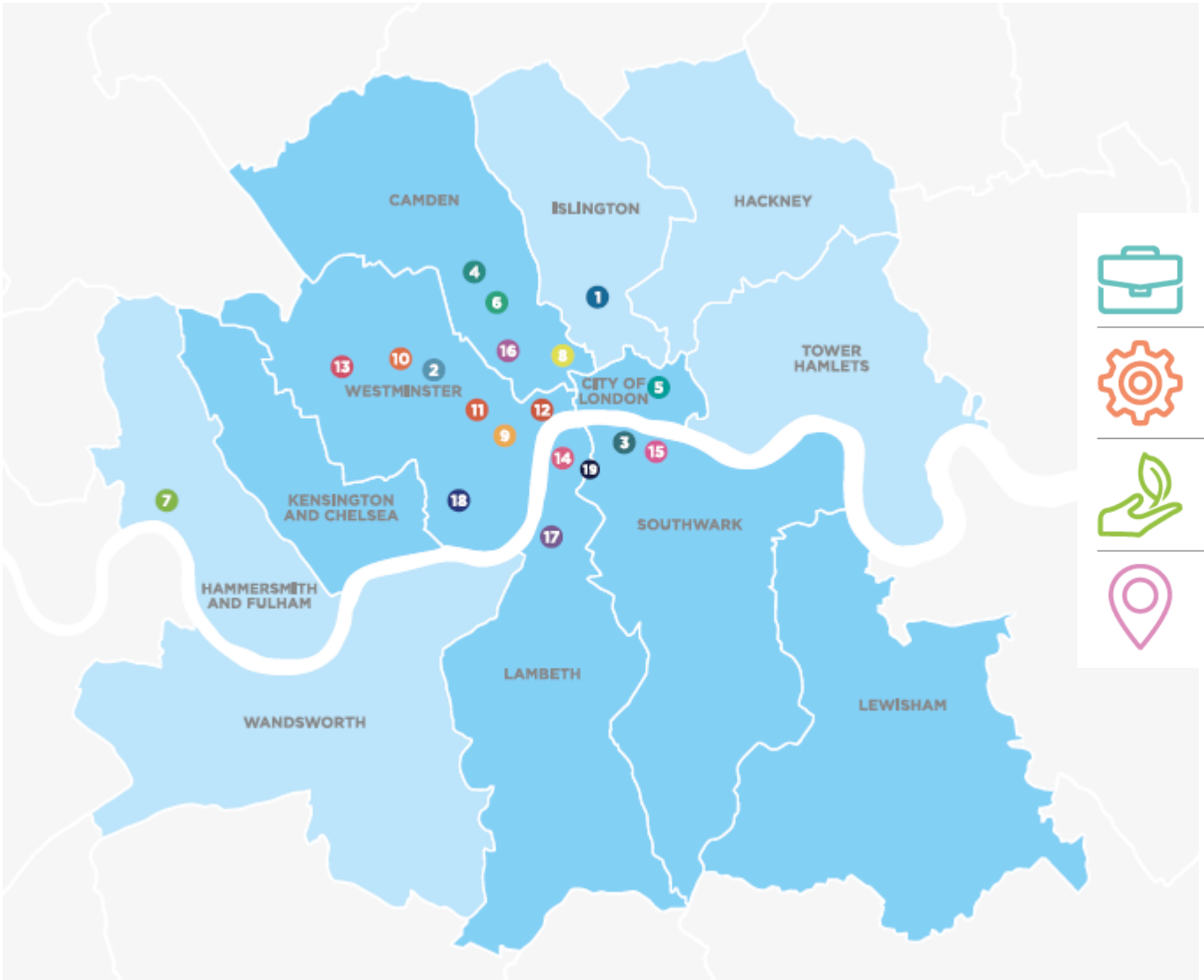

- Good Jobs
- Strong Businesses
- Clean Air
- Great Places

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Contents

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The Case for Electric Freight Vehicles

- Traditionally focus on electrification of passenger cars and buses
- Freight vehicles contribute disproportionately to urban air pollution
- Freight movements remain crucial to well-functioning cities
- Fully electric freight vehicles offer no tailpipe emissions and significant reductions in CO_2 emissions

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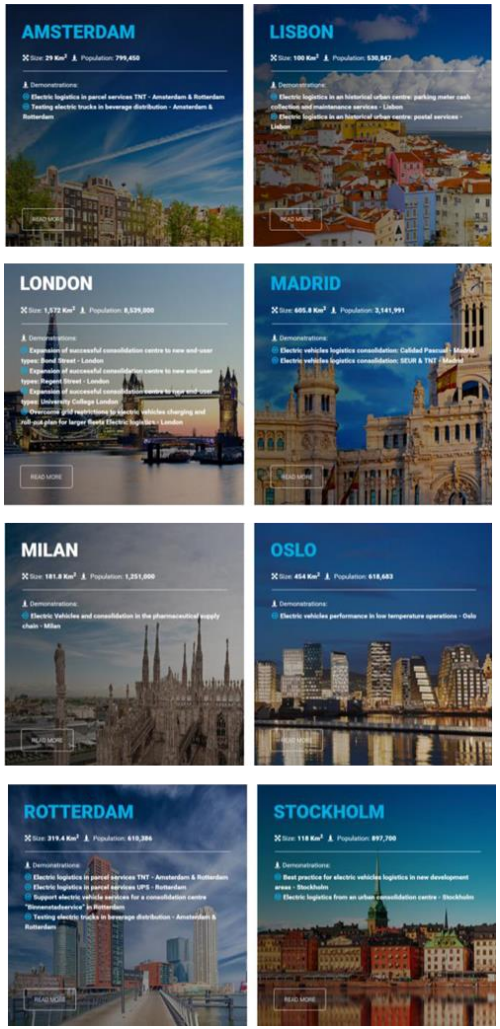
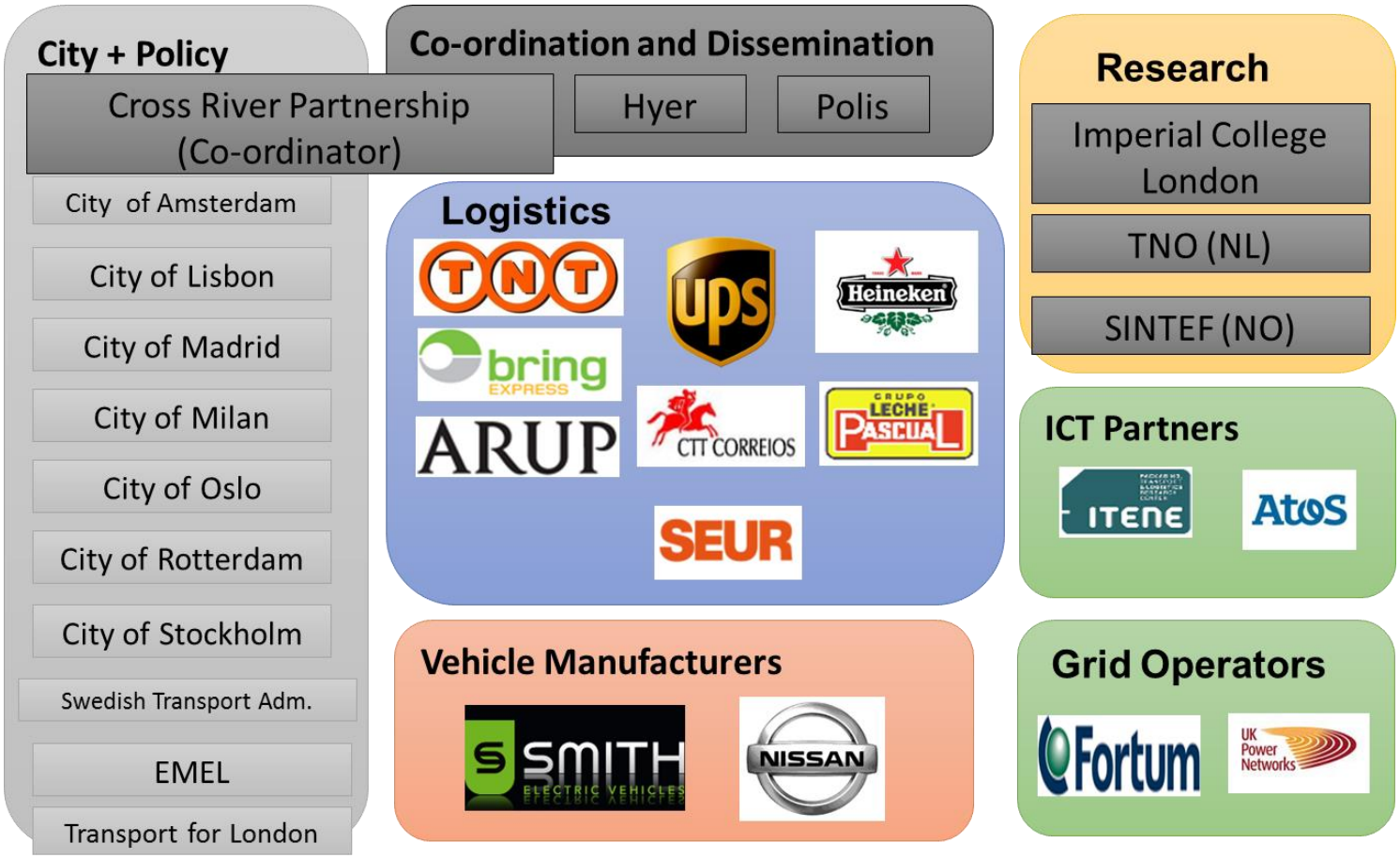
FREVUE
Freight Electric Vehicles in Urban Europe

- 4.5-year EU-funded project
- 8 cities, 32 partners
- To demonstrate the suitability of electric freight vehicles for inner city logistics

FRevue

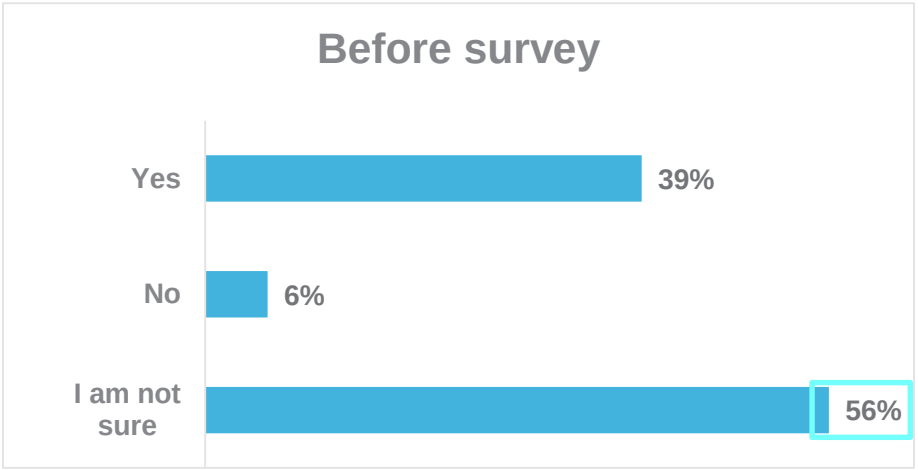


FREVUE Consortium



FREVUE
Attitudes towards EFVs – project start

Question to fleet managers: Are EFVs a viable alternative to ICEs?



FREVUE Vehicles

- Deployed 86 fully electric vans and trucks
- <3.5 tonnes to 19 tonnes

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FREVUE Vehicles

Supplier: Ginaf (NL)

Payload: 4t; Load volume: 25 m3

Battery capacity: 120 kWh; Range: 125 km

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FREVUE Vehicles

Supplier: EMOSS

Payload: 7.5t; Load volume: 38 m3

Battery capacity: 160 kWh; Range: 160 km

FREVUE Vehicles

Supplier: EMOSS

Payload: 7-8t; Load volume: 47 m3

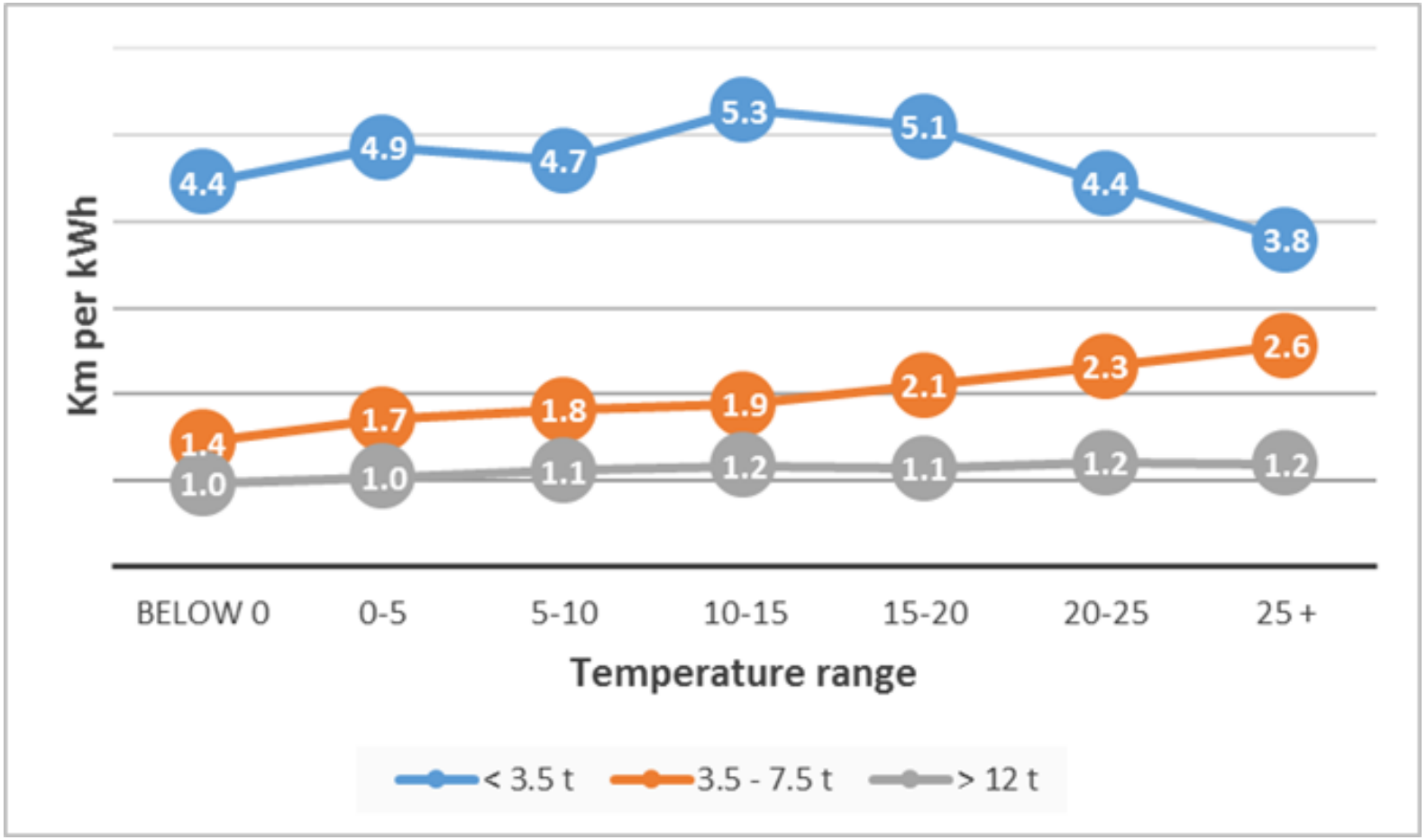
Battery capacity: 200 kWh; Range: 200 km

FREVUE Findings
Data

- Dynamic vehicle data with state-of-charge from
- 10 operators and 83 vehicles
- Covering 757,000 km – 19 times around the Earth at the equator

FREVUE Findings

Km per kWh, temperature and weight group



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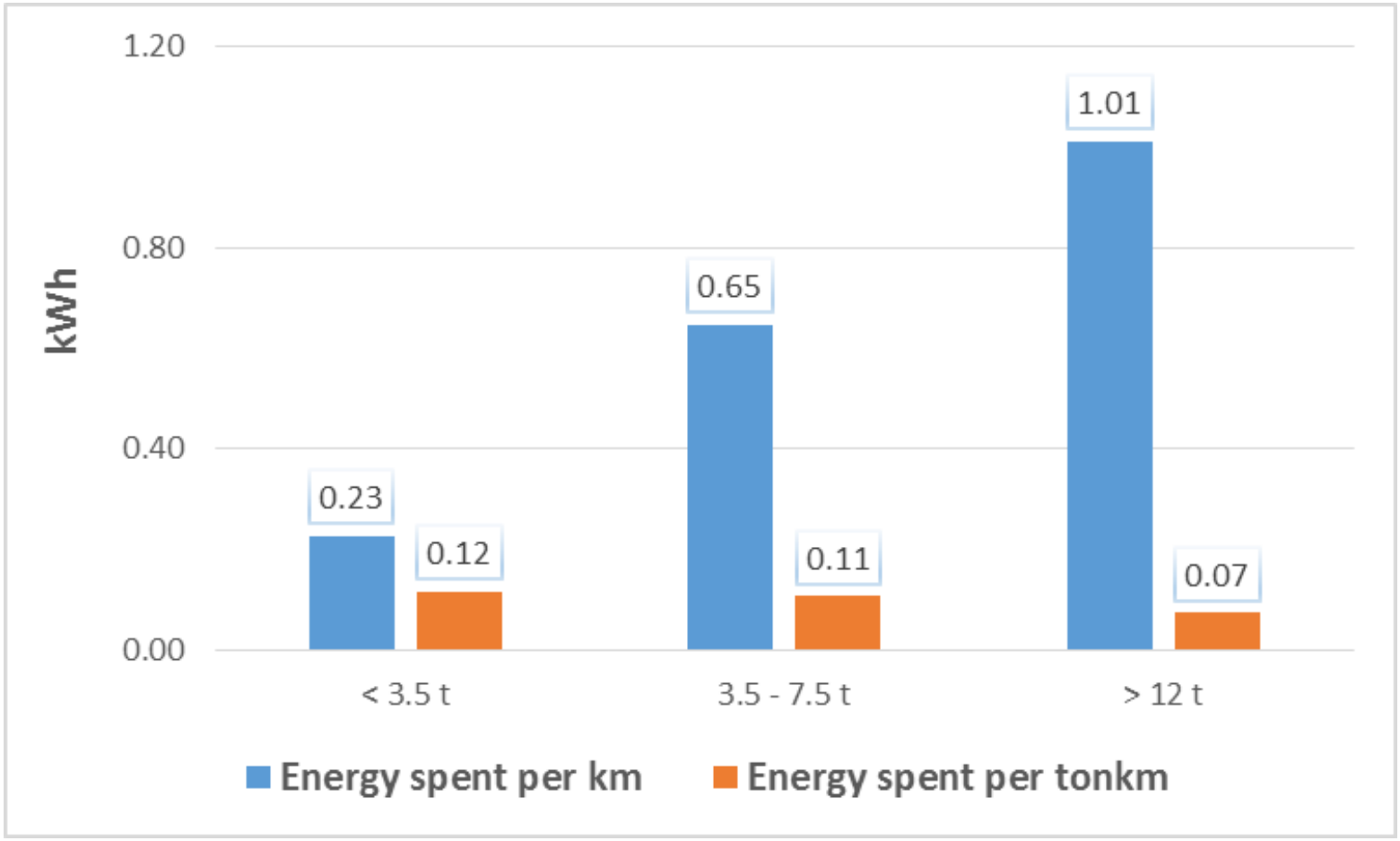
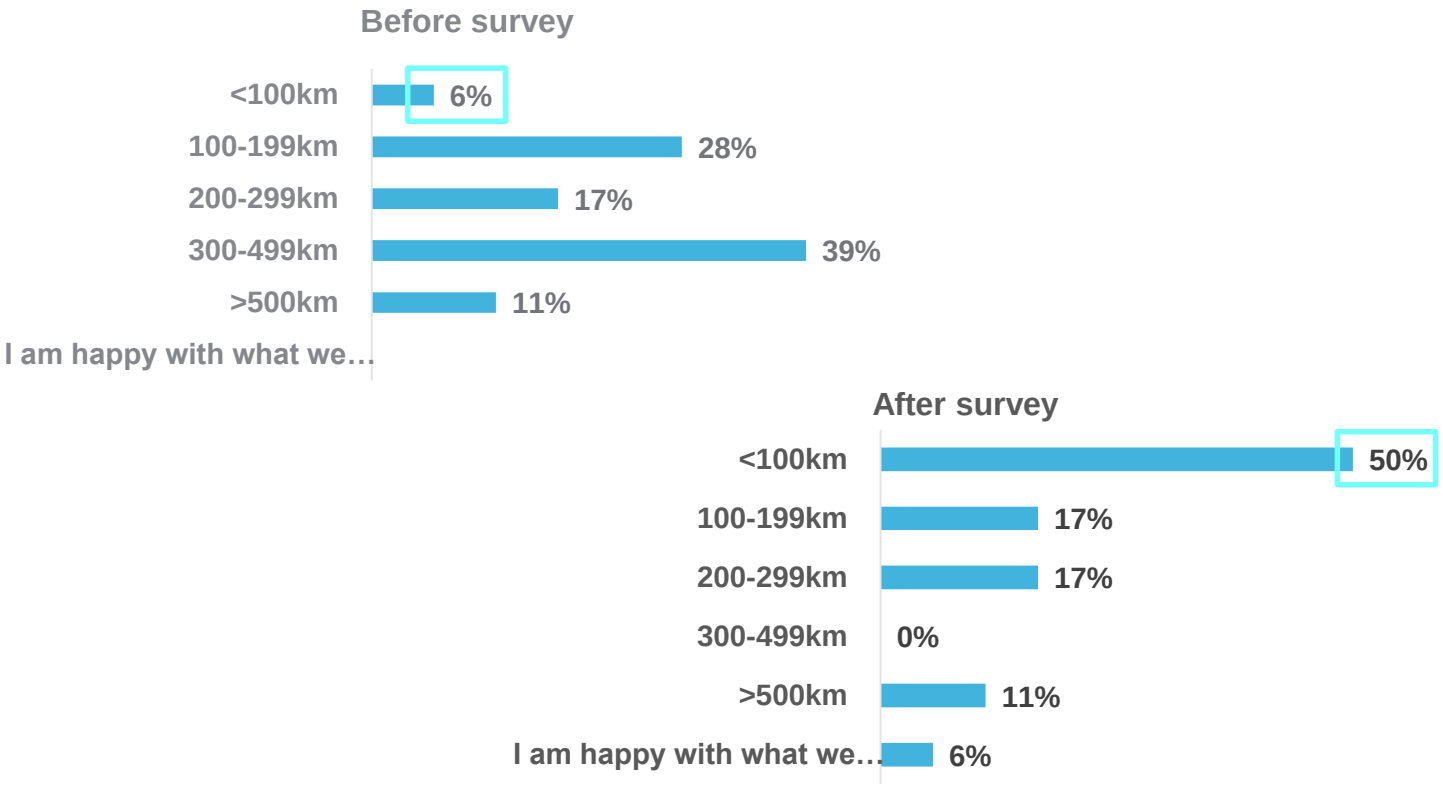
FREVUE Findings

Energy usage taking GVW into account



FREVUE Findings
Range - Mixed messages

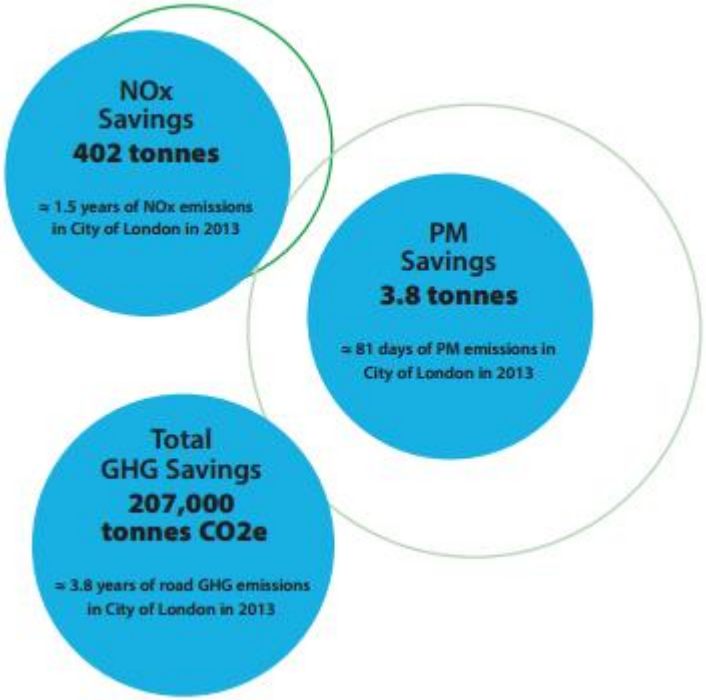
Question to fleet managers: What are your range requirements?



FREVUE Findings
Environmental benefits

- Clear environmental benefits
- Resulting cost savings significant

> IF, IN LONDON ALONE, WE COULD ELECTRIFY 10% OF THE FREIGHT FLEET BY 2021, WE COULD SAVE OVER € 1BILLION PER ANNUM IN PUBLIC SPENDING ON REDUCED HEALTH IMPACTS AND ABATEMENT COSTS.

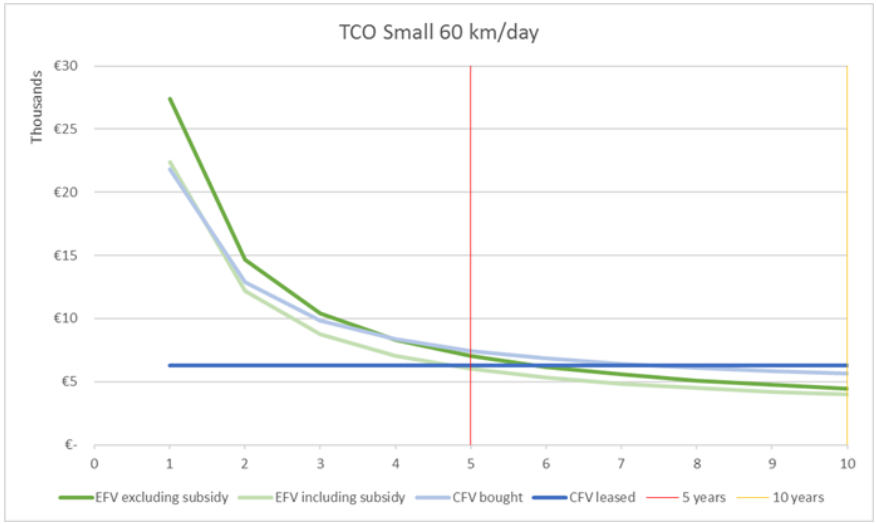


FREVUE Findings
Noise

- Many factors contribute to **road traffic noise**, including vehicle, road, geo-spatial and weather related parameters
- However, EFVs only reduce engine noise
- In the FREVUE project, the impacts are impossible to measure
- Previous studies show that noise reductions from an EFV significant at lower speed

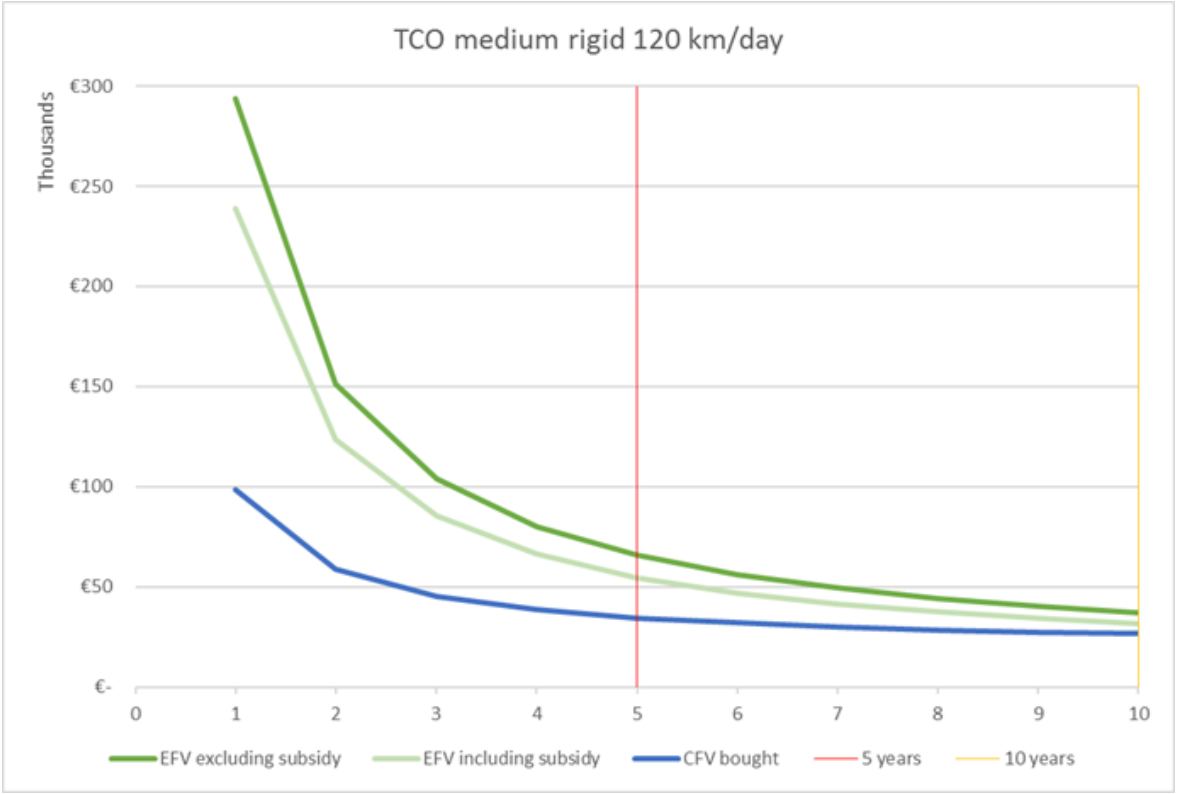
FREVUE Findings Economics

- A positive business case is achievable for small and medium EFV
- For large EFVs this remains difficult



FREVUE Findings
Economics – Key factors

- Financial incentives
- Depreciation period
- Battery specification
- Km driven per day

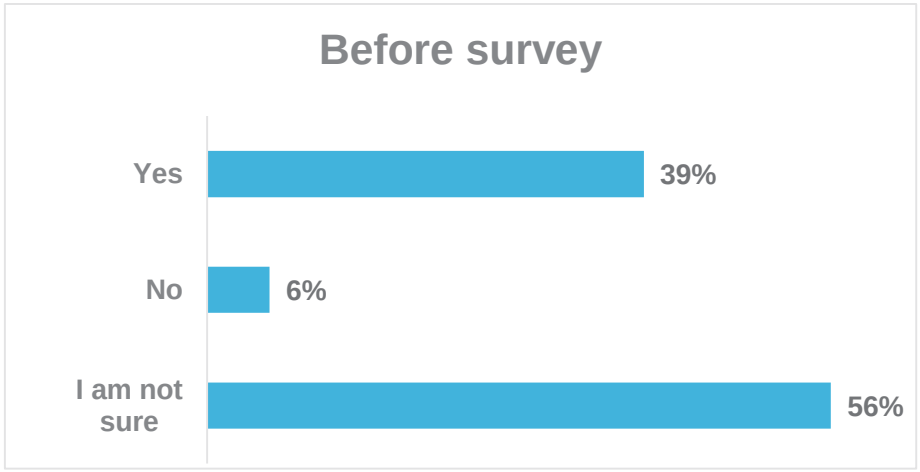


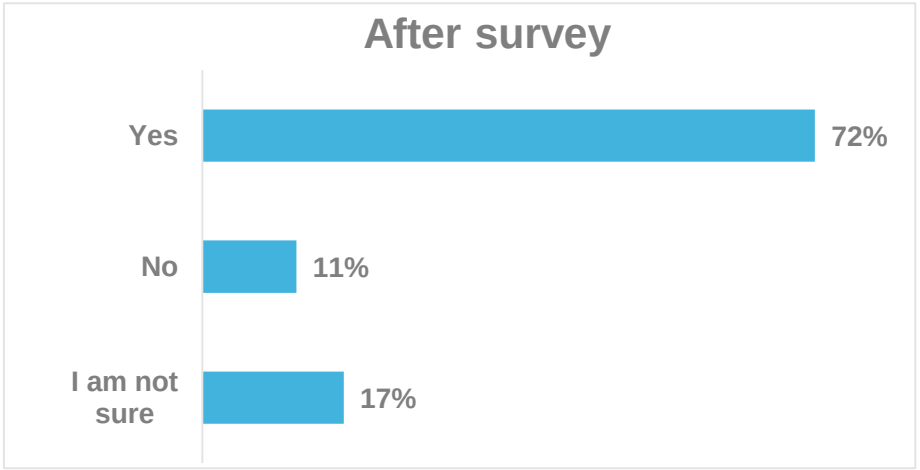
FREVUE Findings
Impact of fast charging

Vehicle class	Expected purchase price difference					
	Converted EFV			Series EFV		
	Slow charging	1x fast charging	2x fast charging	Slow charging	1x fast charging	2x fast charging
<3.5 tonne	46,000	40,000	37,000	15,000	9000	6000
13 tonne	111,000	97,000	91,000	32,000	18,000	12,000
19 tonne	159,000	142,000	136,000	38,000	21,000	15,000

FREVUE
Attitudes towards EFVs – project end

Question to fleet managers: Are EFVs a viable alternative to ICEs?





EFV Uptake

September 2017 McKinsey Report*:

eTruck market share could reach 15% by 2030

Our latest research reveals that eTrucks could account for 15% of global truck sales by 2030, with favorable segments like urban light duty trucks reaching sales as high as 25-35% in China and Europe.

*Source: McKinsey (2017): New reality: electric trucks and their implications on energy demand

EFV power requirements

- EFV power requirements and charging patterns different to passenger cars and buses

> An18t single-shifted truck with a 200kW battery in daily operation requires an average of **163 kWh per day** to charge. In comparison, a medium-sized van requires approximately 30kWh per day

- Little diversity in charging patterns of large EFVs

> Large (over 12 tonnes) and medium (3.5 tonnes to 7.5 tonnes) EFVs within FREVUE tended to be **charged only once a day** in the late afternoon at the operator's depot.

- Providing challenges but also opportunities

Local grid infrastructure capacity

- Overall impact still low but local constraints pose problems
- FREVUE partner UPS encountered grid infrastructure constraints when charging all EFVs at the same time
- Infrastructure upgraded to charge up to 63 vehicles
- Such infrastructure upgrade has proven:
  - Costly, lengthy and disruptive
  - Non-incremental
  - Requiring investment in 3rd party assets

→ **Barrier to the large-scale deployment of EFVs**

Smart Electric Urban Logistics

- An **additional 20 EFVs** at UPS central London depot
  - Bringing the number above the maximum that can theoretically be charged
- Design and implement an **innovative smart charging system** at this depot together with an energy storage system
- Design and implement a sophisticated **network capacity assessment tool** developed to take into account time of day variation in demand
- April 2017 to March 2019, funded by UK Office for Low Emission Vehicles

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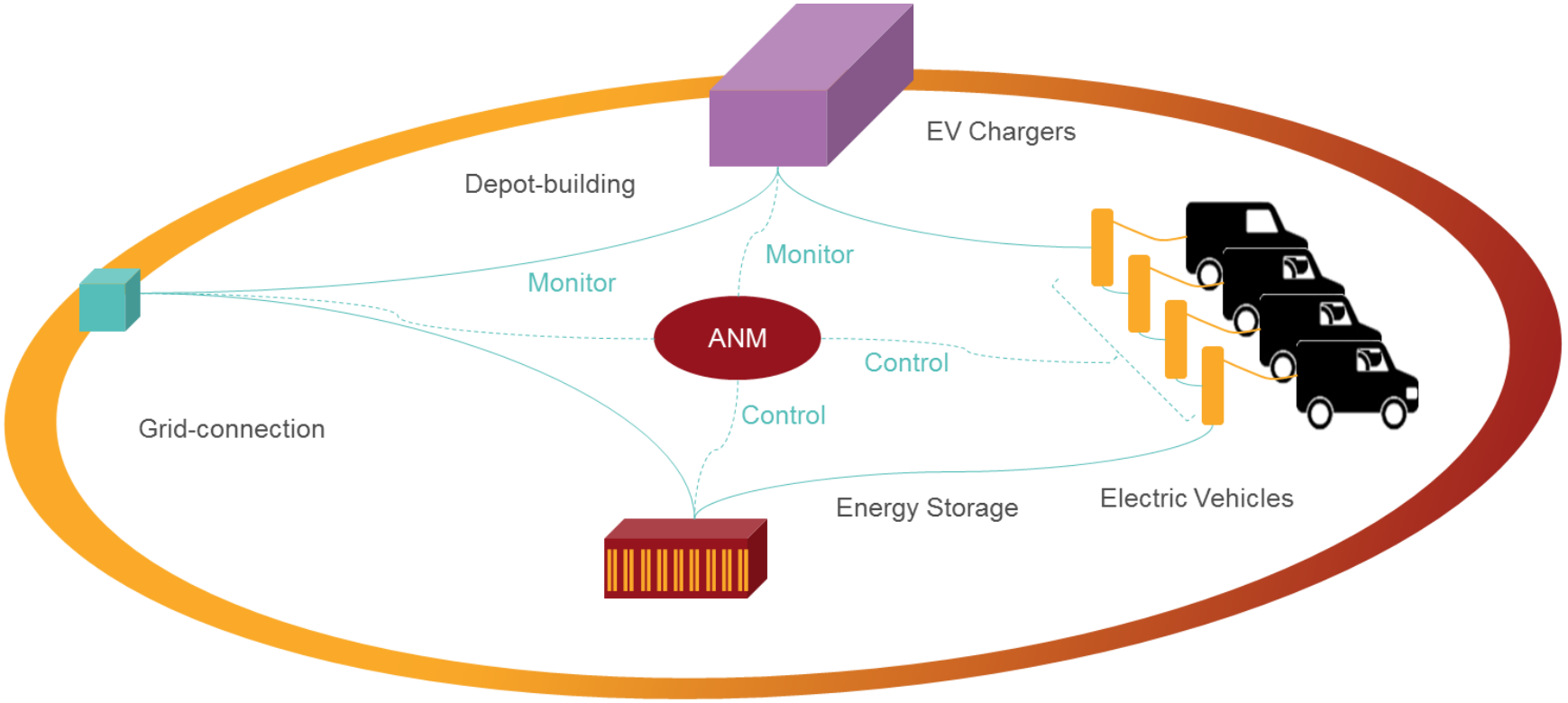
Smart Electric Urban Logistics Active Network Management



Smart Electric Urban Logistics (cont'd)

- Expected results
  - 5-year vision: Develop roadmap of how all 170 vehicles at UPS central London depot could be electric
  - Clarify how these results are transferable to other fleet operators

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Thank you

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