On behalf of:

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

Transport and Climate Change Week

Focus 2017: Urban Mobility

18 - 22 September 2017

Learning from case studies: Last-mile delivery, digitalisation and consolidation centres

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UNIVERSITY OF WESTMINSTER

Workshop II on Urban Freight

Berlin, 20 Sep. 2017

Objectives of case studies on freight transport operations

- To inform on cases in urban or long distance context
  - Trials and demonstrations of technical feasibility and economic profitability
    - Sustainability
    - Decarbonisation
    - Profitability
    - Social acceptance
  - Impacts estimates or assessments
  - Expectation/assumption: Other businesses are going to replicate and scale up the solution on the market
  - Sources, references
  - Contacts, networking

Emporia Malmö Shopping Centre Consolidation Case

Large shopping centre with many tenants

- 75 000 sqm shops & restaurants
- 200 tenants
- Long distances in the building

Large freight flows and high values

- 300 deliveries/day
- 500 internal transports/day to/from tenants
- Highly valuable goods

Large waste flows

- 20 ton waste/day
- Very high environmental ambitions

LOGISTIK MALMÖ

En partner som ansvarar för helheten!

Goods handling process in Emporia

LOGISTIK

4. Goods are delivered and signed for by the tenant, in the store

3.Internal deliveries are made by adjusted equpment

2. Joined transport

1. Control, receipt, sorting and registration of the goods in our goods managment system. Automated info to the tenants via e-mail/sms

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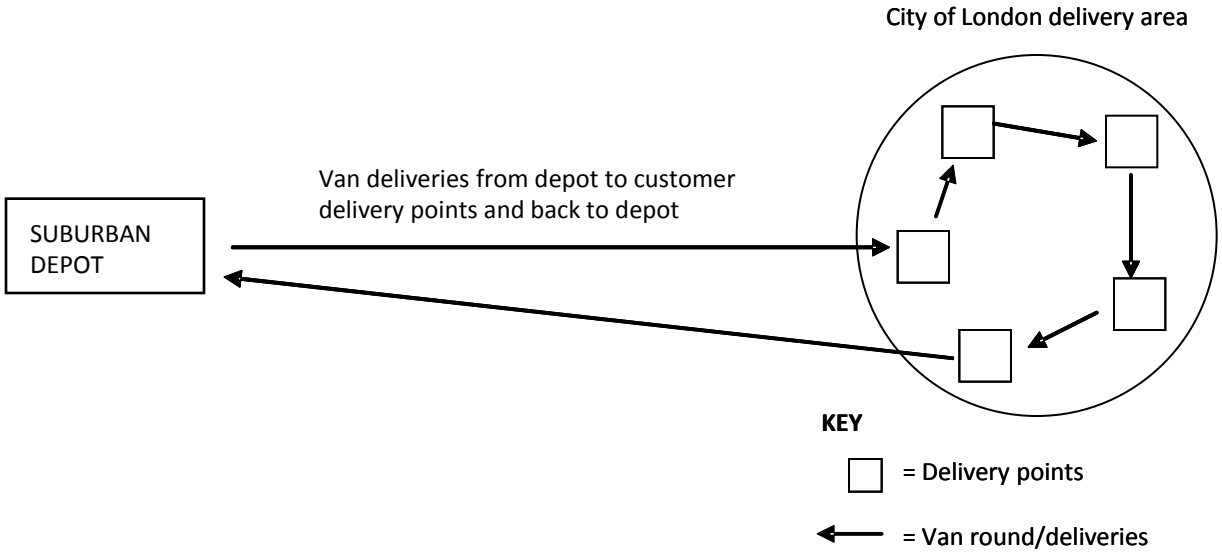
Electric vehicles and depot for retail deliveries in Central London: The case of Gnewt Cargo

Objectives

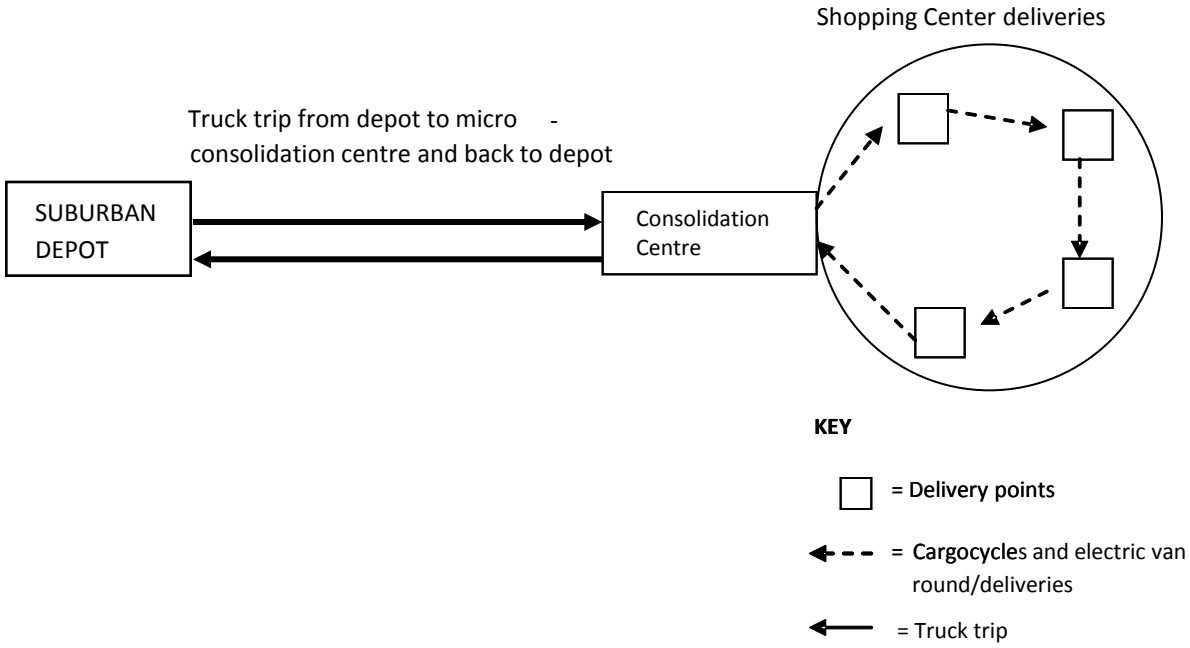
- To introduce/understand EV developments in goods transport with an in-depth case of Gnewt Cargo
- To evaluate the previously existing Office Depot deliveries to postcodes EC 1 - 4 (City of London) using diesel vans
- To compare this with the new Gnewt Cargo logistics system implemented using Cargocycles and electric vans for final delivery
- To evaluate the impacts on:
  - Total distance driven in London and in delivery area
  - Road space occupancy during parking while making deliveries
  - Energy use and greenhouse gas emissions

"Before" and "after" delivery system

- Original diesel van delivery system studied Feb–March 2009 –before the trial went live.
- In the original system diesel vans departed from a suburban depot to make deliveries to postcodes in central London (EC1, EC2, EC3 & EC4)
- New Cargocycle and electric van delivery system studied Nov 2009 – May 2010
- New delivery system was implemented incrementally:
  - Initially an intermediate system was used which involved Cargocycles, electric and diesel vans (Nov 2009-March 2010)
  - The new system using only Cargocycles and electric vans was fully implemented in May 2010
- In the new system a diesel truck is used to transport goods from the suburban depot to the City of London for onward delivery by Cargocycles and electric vans



Logistics system for deliveries by diesel vans



Logistics system for deliveries with cc

Actors‘ analysis UCC set-up

- Local logistic Operators
  - What to do?
  - How to earn money, not loose ?
  - What conditions I need to have?
- Local Authority
  - How to set up new access rules?
  - Obligation to use clean vehicle to access?
- Shopping mall owner
  - Is is obligation or free for shops to receive deliveries via a Shopping centre consolidation
  - …
- National Government
  - Supportive rules for local governments
  - Organise stakeholder consultation

…

How did the Start-up started?

- Start-up with 2 owners
- Business decision from Office Depot (OD)
- Private equity financing (no bank loan)
- Purchase of a clean fleet
- Rent of a small depot of 240 m^2
- 150-900 parcels a day in Central London
- All equity was paid back after one year
- Regular payments from first big client

How to calculate the benefits and impacts?

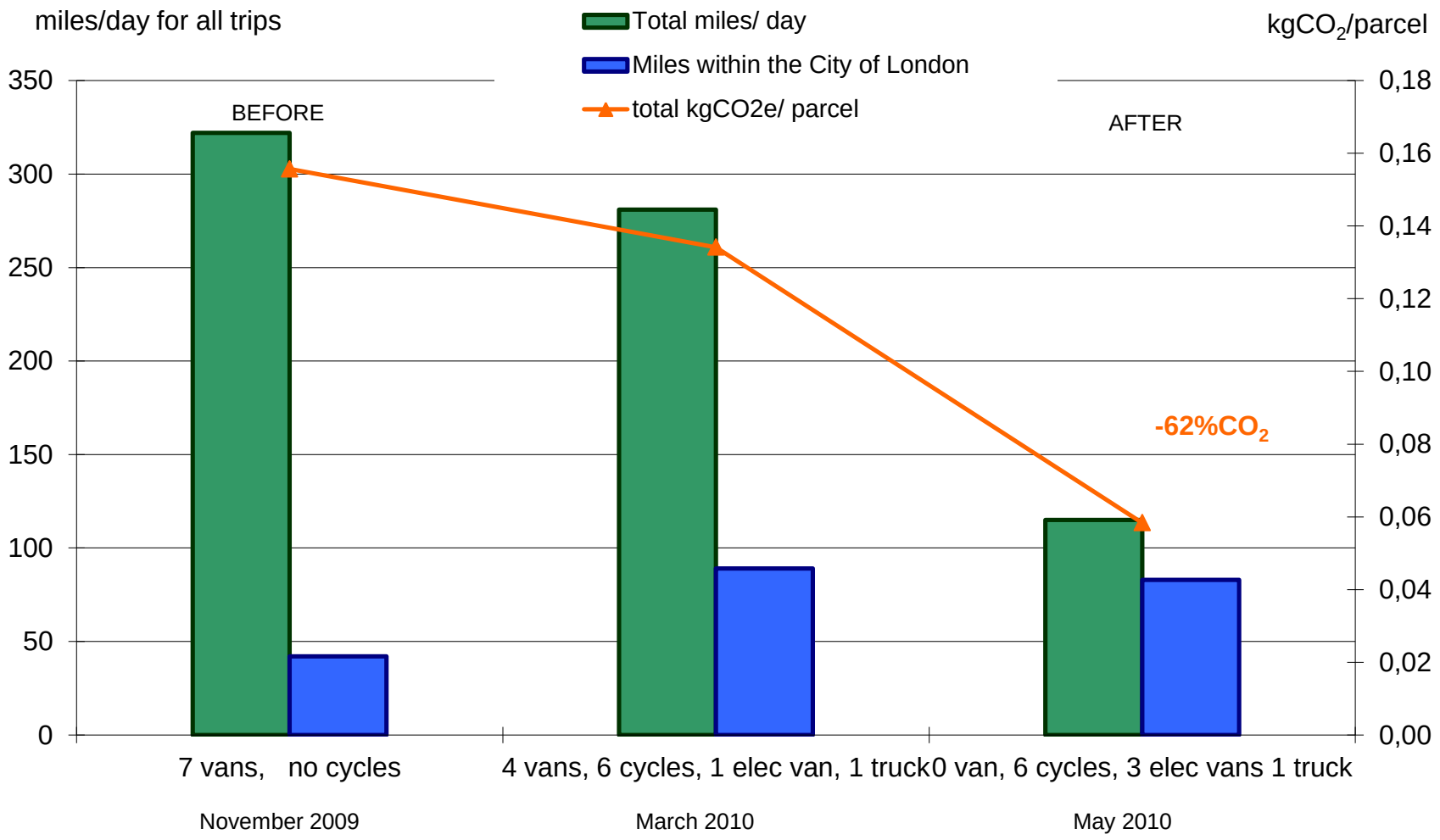
- Apply a standard methodology for urban freight?
  - Not available yet
- Case specific adaptation of energy, distance and CO_2 calculation for freight transport
- Adding criteria that are relevant for cities

BEFORE: Standard 3.5t diesel van: Capacity of 1270 kg and 9 m^3

Electric van: Capacity of 445 kg and 3 m^3

Cargocycle: Electrically assisted tricycle with a capacity of 180 kg and 1.5 m^3

Progressive impacts of fleet replacement by Cargocycles and electric vans



Impact of vehicle length on kerbside parking occupancy during one day, *assuming identical stopping points*

	BEFORE	AFTER
	7 vans, no cycle	6 cycles, 3 elec vans
All diesel vans stops/day	140	0
All Cargocycles stops/day	0	80
All electric vans stops/day	0	60
Parking length requirement: Metres for all diesel vans/day	799	0
Parking length requirement: Metres for all Cargocycles/day	0	188
Parking length requirement: Metres for all electric vans/day	0	199
Parking length requirement: Total metres for all vehicles/day	799	387
Parking length requirement index of all vehicles/day	100	48
Reduction Parking length requirement for all vehicles/day		- 52%

Vehicle length: Diesel van: 5.71m; Electric van: 3.32m, Cargocycle: 2.35m

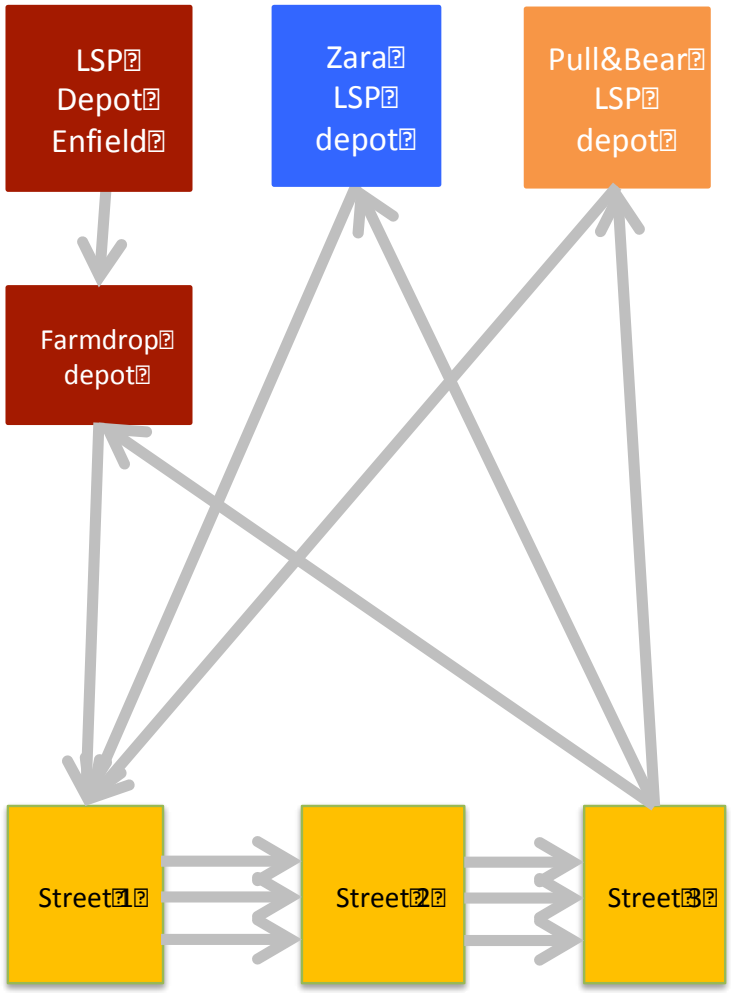
Outlook: Business growth

New depot 2014-2017, 2500 m^2 and 60-100 vans

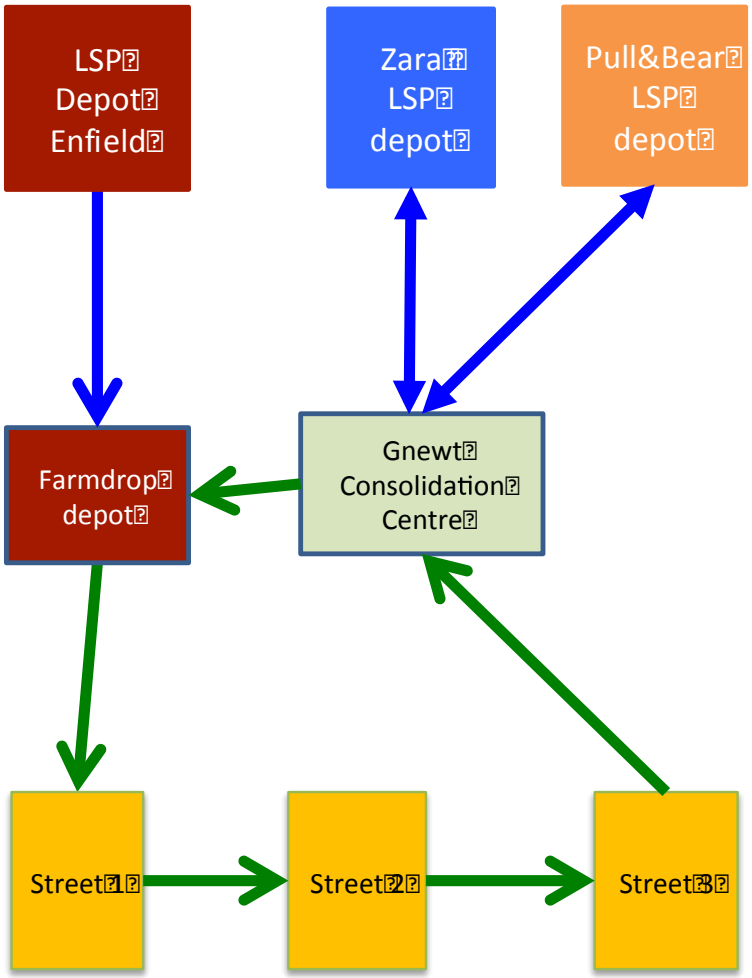
Business model *(1 of many)*

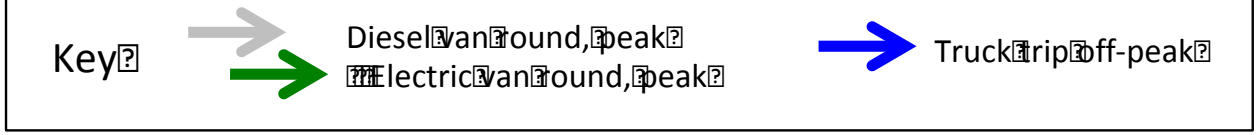
Retail logistics: single-carrier deliveries

BEFORE *Starting using Gnewtcargo*



AFTER *Starting using Gnewtcargo*





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Testing new vehicles

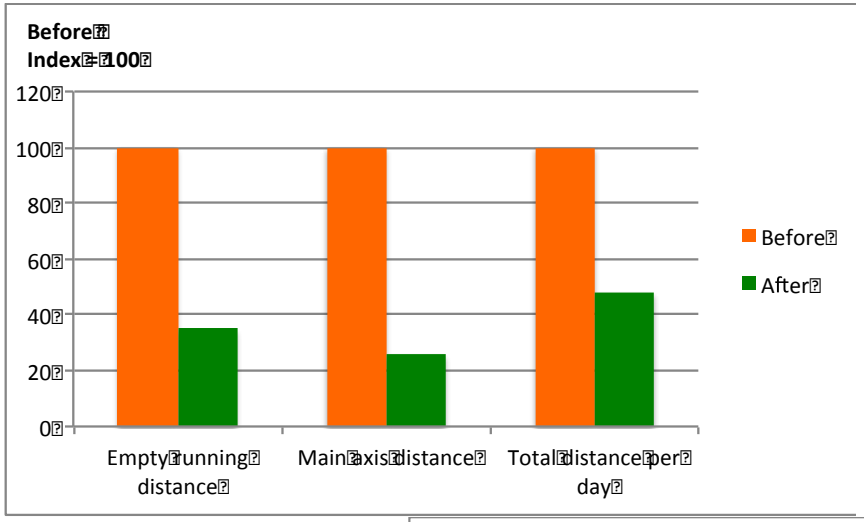
Congestion, traffic & mileage reduction

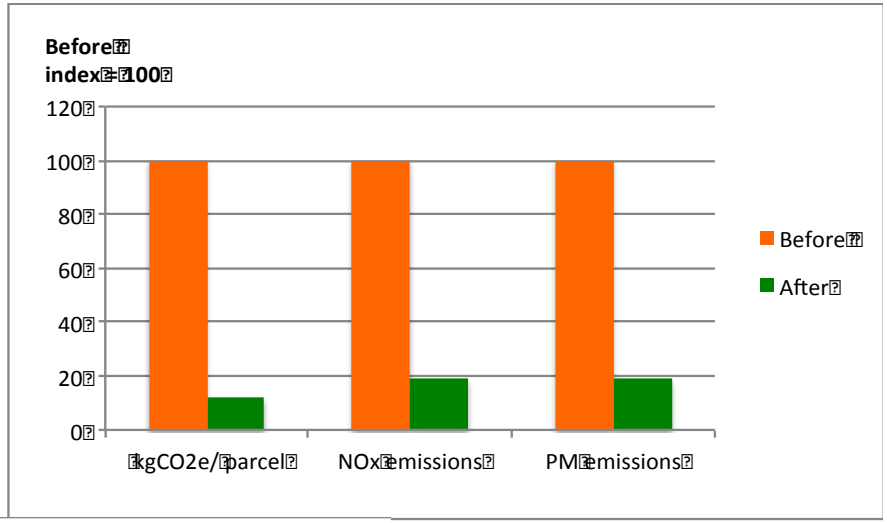
Impacts when using a central depot (UCC)

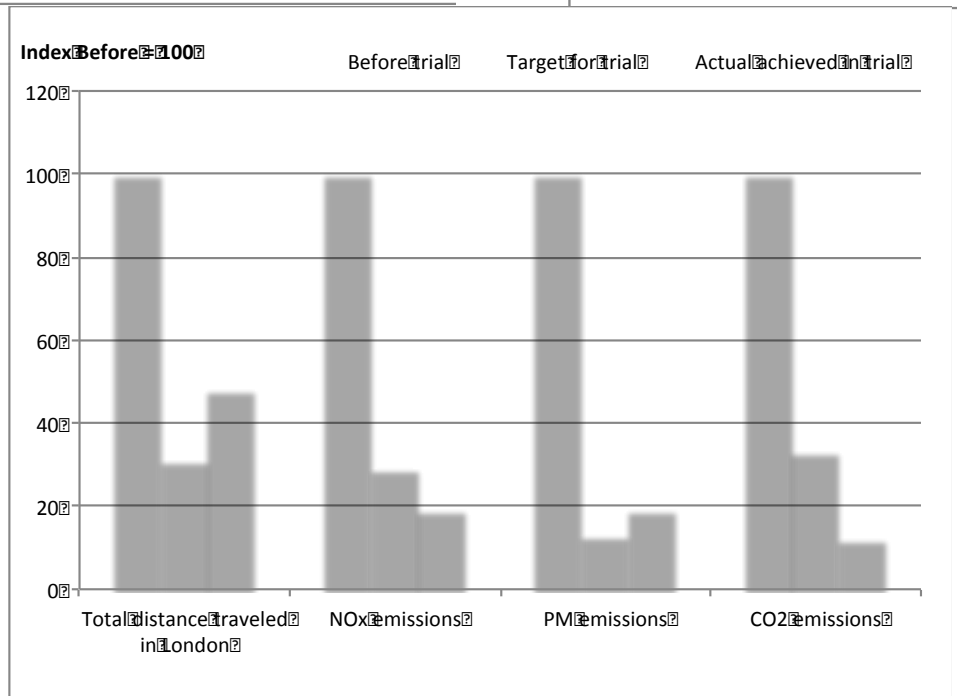
Before: Hermes delivery trip, depot in Enfield

After: Hermes trip to Gnewt Cargo UCC

New impact assessment 2016/17







Benefits and impacts of electric vehicle use in London

- Micro-consolidation centre and replacement of the diesel van fleet by electric vans and tricycles
- →Reduction of 20-70% in the total distance driven by vehicle per parcel delivered, depending on the clients
- The total CO_2 equivalent (CO_2e) emissions per parcel delivered was 54% lower in May 2010 than in October 2009 before the trial. In 2015 the last mile CO_2 reduction is 85-90% per parcel. In 2016/17 for TNT the CO_2 reduction is 100%, the distance/parcel is -67%.
- Use of electric vehicles using fuel generated from renewable, carbon-free sources in the City of London.
- Start-up company was profitable after 3 months
- Strong growth and upscale now to 100 vehicles & 3 depots
- 3 million parcels were delivered 2016 in Central London

Sources: www.gnewtcargo.co.uk; www.bestfact.net

Trade Fair Delivery Management System in Basel

An access regulation support system for trade fair deliveries

→Situation improved with introduction of time slots due to better planning of capacities

→ The efficiency of all logistic processes at the fair grounds improved according to feedback

→ The acceptance was high, 90% of 7,000 trips were pre-registered for the first fair

Online registration of a delivery

Online confirmation with bar code

Access during time slot at check point

Access denied if time slot is missed

Traffic situation on the Trade Fair grounds

Before

After

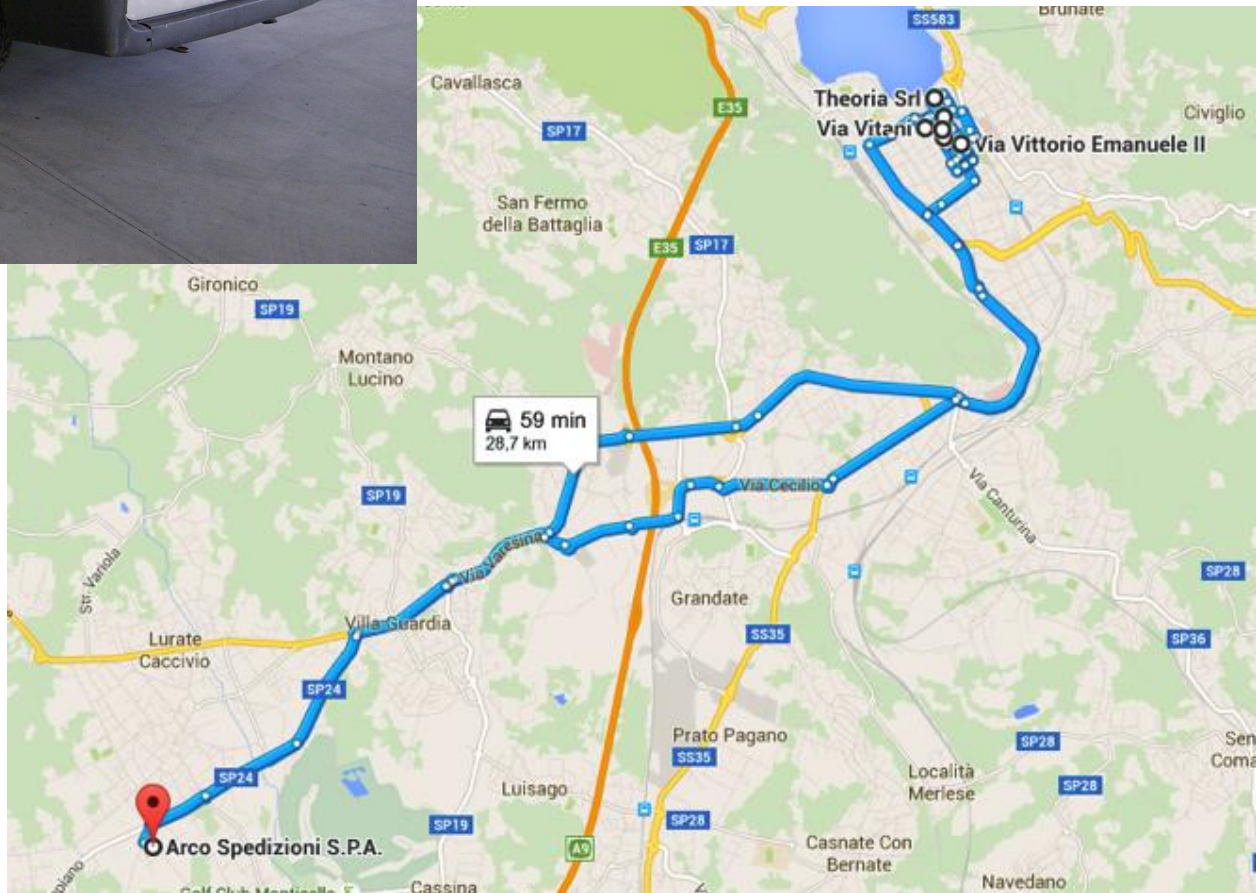
Benefits of the new Trade Fair Basel solution

- Reduction of traffic congestion on major national and transnational routes (inner city roads and motorway access). For peak delivery and pick-up days related to major fairs, 15km of congestion were measured due to trucks blocking the highway exits in order to reach the checkpoint.
- The use of automated IT supported processes at the check point allows the handling of 95% of all arriving transports within less than 3 minutes (target: <1 min).
- Automation of billing and invoicing related to all logistics activities
- Efficiency gains are reflected in time gains within the occupancy schedule on the fair grounds. Through consolidation additional events can be held at the fair grounds: increased capacity utilisation and increased revenues.

Como trial
“Before” situation

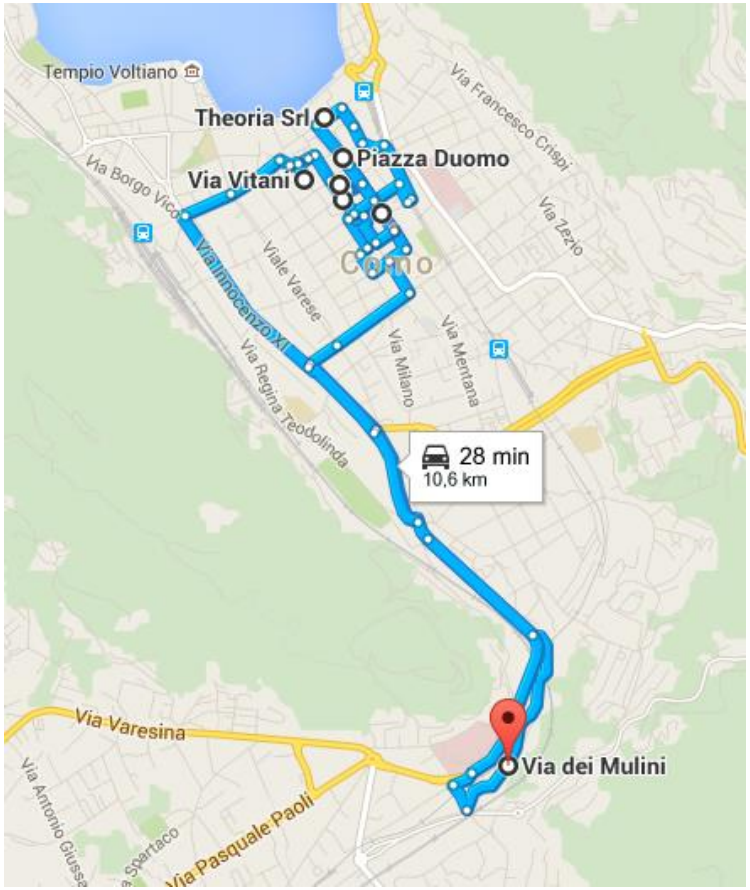
3.5t diesel van

Delivery round starts from Arco Spedizione 10 km away from “pedestrian” City Centre Area




www.smartfusion.eu
Smartfusion
Project No. 285195

"After" delivery round starts from Merci in Centro depot



Como trial: impact results

Distance per parcel = -37%

Logistics	*Units*	*km/day diesel vans*	*km/day diesel trucks*	*km/day electric vans*	*km/day total all vehicles*	*Distance in km per parcel*	*Index distance per parcel*
Before: Diesel vans starting at Arco depot		32			32	0.56	100
After: Electric vans + UCC Via dei Mulini		0	10	10	20	0.35	63

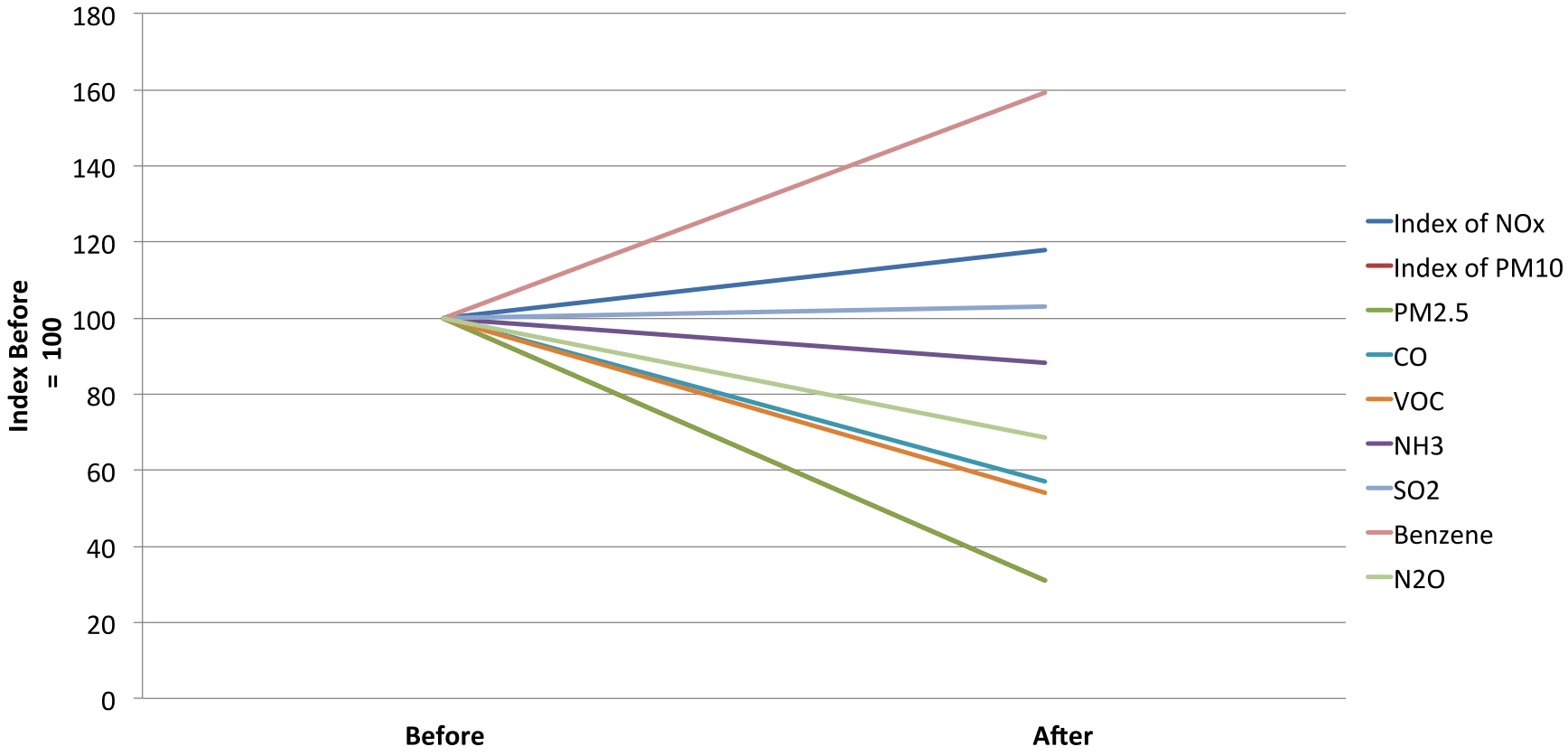
CO_2 per parcel = -39%

	Energy		CO_2 equivalent			
	Litres diesel/ day	*kWh/ day*	*$kgCO_2e$ / day*	*$kgCO_2e$/ parcel*	*Index $kgCO_2e$/ parcel*	*Reduction in $kgCO_2e$/ parcel*
Before	4.1	0	13	0.222	100	-
After	2.5	2.6	8	0.136	61	-39%

Costs = +6%

	Staff		**Costs**						
	Number of staff	Index number of staff	Parcels delivered per staff per day	Total costs per staff/ day in €	Total costs energy/ day in €	Other fixed and variable costs €/day	All vehicles costs €/day	Total costs €/ parcel	Index total costs per parcel
Before	1.2	100	48	108	5	51	164	2.88	100
After	1.6	130	37	140	3	30	174	3.05	106

Como trial impacts on air pollutants



Points for discussion

- Learning from innovative solutions
- Learning from cases
- How to adapt a solution to your own business?
- How to develop a case study yourself?
- Using a powerful, simple assessment method:
- Description of case (who, what, where, how); Benefits and costs; Barriers; Success factors; Contacts
- What did you expected when starting your case study?
- What are your main findings and results on the case?
- What are you missing?