UCC typologies
& good practice assessment

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Review objectives

- To review existing literature on urban consolidation centres (UCCs)
- To investigate different types of consolidation practice, considering both the business and environmental case
- To obtain the views of a sample of relevant parties on the appropriateness of different types of UCC and their impacts
- To carry out a preliminary evaluation of the situations in which each type of UCC is likely to be most appropriate
Good practice assessment (case study) objectives

• Evaluate the previously existing Office Depot deliveries to postcodes EC 1 - 4 (City of London) using diesel vans

• Compare this with the new Gnewt Cargo logistics system implemented using electric tricycles and electric vans for final delivery

• Evaluate the impacts

• Develop a concept model to trial a network of micro-consolidation centres in the Clear Zone area based on the segment analysis.

• Assuming the operation of the concept model, analyse the benefits of replacing current deliveries with micro-consolidation vehicles.
Methodology

• Comprehensive review of literature:
  – Identification of schemes
  – Details of scheme evaluation
  – General discussion/evaluation of UCCs
• Interviews with selection of relevant parties
• UCC evaluation:
  – Success/failure factors
  – Recommendations for evaluation
Terminology

• Range of concepts/terminology, including:
  – Consolidation centres
  – Transhipment centres
  – Public logistics terminals
  – Urban platforms
  – Off-site stock room/logistics support centre
  – Collection points

• All above involve a physical centre, but boundaries are blurred

• Also other forms of consolidation
How does a UCC work?
Deliveries to store versus deliveries to consolidation centre

- Fewer vehicle kilometres
- Less time spent making deliveries
- Less time in congested traffic
### Analysis of UCCs by country and category

<table>
<thead>
<tr>
<th>Country</th>
<th>Special project (construction)</th>
<th>Shopping centre</th>
<th>Town/city Specific district</th>
<th>Town/city Town/wide</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Belgium</td>
<td>-</td>
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<td>1</td>
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</tr>
<tr>
<td>Canada</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>1</td>
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<tr>
<td>France</td>
<td>-</td>
<td>-</td>
<td>4</td>
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<td>Germany</td>
<td>1</td>
<td>-</td>
<td>4</td>
<td>9</td>
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<td>Italy</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Japan</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Monaco</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Netherlands</td>
<td>-</td>
<td>-</td>
<td>6</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Portugal</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Spain</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Sweden</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>4</td>
</tr>
<tr>
<td>Switzerland</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>U.S.A.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3</strong></td>
<td><strong>5</strong></td>
<td><strong>30</strong></td>
<td><strong>29</strong></td>
<td><strong>67</strong></td>
</tr>
</tbody>
</table>

**Note:**
- Site Specific = UCC scheme serves a single site or commercial unit (of which three – Hammerby, Potsdamer Platz in Berlin, and Heathrow Airport are construction consolidation centres, the other five are shopping centres).
- District = UCC scheme serves part of a town/city - usually historic centre.
- Town-wide = UCC scheme serves the whole town.
# UCCs by status

<table>
<thead>
<tr>
<th>Status</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research/Feasibility</td>
<td>26</td>
</tr>
<tr>
<td>Pilot/Trial</td>
<td>13</td>
</tr>
<tr>
<td>Operational</td>
<td>28</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>67</td>
</tr>
</tbody>
</table>
## Analysis of UCCs by date of investigation / start-up

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1970-1975</td>
<td>6</td>
<td>9</td>
<td>19</td>
<td>17</td>
<td>15</td>
<td>66</td>
</tr>
</tbody>
</table>

Classification of UCCs

• Special project UCCs:
  – Construction sites
  – Permanent or fixed period

• UCCs on single site with one landlord:
  – Airports
  – Shopping centres

• UCCs serving a town/city (or district of):
  – Geographical area: large or small
  – No. of companies: single or several
Construction Consolidation Centre Heathrow
Logistics Consolidation Centre
Stockholm, Sweden
Freight Consolidation Scheme

Target Area - Broadmead

- Broadmead, Bristol’s core retail area
- Approx 324 retail units
- Air Quality Management Area
- Clear Zones Strategy
- Broadmead Expansion
Bristol Consolidation Centre

Consolidation Centre Location

- Located on western fringe of Bristol on established industrial estate;
- Close to strategic road network (M5, M4);
- Approx 3000 sq ft warehousing space;
- 10 miles from city centre target area;
- Approx 25 mins journey time to target area;
- Operates using a 9 tonne electric vehicle and an 18 tonne Euro 4 vehicle;
- All drivers are SAFED trained;
La Rochelle city centre consolidation and use of electric vehicles for final delivery, managed by the provider Elcidis
Key evaluation issues

• Lack of rigorous (published) assessment of previous schemes:
  – Little quantification of impacts
  – No standardised methodology for assessment
  – Issues of confidentiality

• Little or no prior knowledge of UCC concept amongst certain “interested parties”
## Impacts included in UCC scheme evaluations identified

<table>
<thead>
<tr>
<th>Impacts of UCCs</th>
<th>Number of the UCC studies quantifying this (out of the 14 studies identified)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes in the number of vehicle trips</td>
<td>7</td>
</tr>
<tr>
<td>Changes in total fuel consumed</td>
<td>6</td>
</tr>
<tr>
<td>Changes in vehicle emissions</td>
<td>5</td>
</tr>
<tr>
<td>Changes in the number of vehicle kilometres</td>
<td>4</td>
</tr>
<tr>
<td>Changes in the number of vehicles</td>
<td>4</td>
</tr>
<tr>
<td>Vehicle load factor</td>
<td>4</td>
</tr>
<tr>
<td>Changes in parking time and frequency</td>
<td>4</td>
</tr>
<tr>
<td>Changes in operating costs</td>
<td>2</td>
</tr>
<tr>
<td>Changes in travel time</td>
<td>1</td>
</tr>
<tr>
<td>Goods delivered per delivery point</td>
<td>1</td>
</tr>
</tbody>
</table>
Evidence of transport impacts

• Claimed reductions in key measures (e.g. vehicles, trips, kms, utilisation):
  – Little rigorous analysis
  – High localised savings, limited overall impact

• Ability to separate trunk and local movements:
  – Alternative modes or vehicle types
  – Focus on improving “last mile”
Wider supply chain impacts

• Many potential benefits, limited documented evidence
• Improved management and visibility of supply chain
• Specific benefits can include:
  – Local stockholding, with pre-retailing and quick response
  – More productive floorspace use at destination
  – Fewer deliveries (and disruption) at destination
  – Returns and recycling
Success factors

• Availability of funding
• Strong public and private sector involvement
• Bottom-up pressure from local interests
• Supporting regulatory framework
• Significant existing transport problems in local area
• Ability to resolve wider logistics problems
• Single manager/coordinator
Recommendations

• Allow time to establish scheme viability
• Public funding needed for “pump priming”
• Ensure big role for private sector
• Raised awareness and guidance needed (esp. for public sector)
• Consider wider logistics impacts (esp. costs)
• Firmly establish “before” situation to allow proper evaluation
## Variables and indicators to be included in a comprehensive UCC evaluation

<table>
<thead>
<tr>
<th>Broad Indicators</th>
<th>Narrow Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1) Logistics and supply chain changes</strong></td>
<td><strong>3) Goods vehicle activity</strong></td>
</tr>
<tr>
<td>- Efficiency at receiving premises due to fewer, more reliable deliveries</td>
<td>- Vehicle kms</td>
</tr>
<tr>
<td>- Efficiency/sales at receiving premises due to stockholding &amp; value added services</td>
<td>- Vehicle trips</td>
</tr>
<tr>
<td>- On-time delivery (punctuality)</td>
<td>- Vehicle load factor</td>
</tr>
<tr>
<td>- Change in order cycle time</td>
<td><strong>4) Loading/unloading activity</strong></td>
</tr>
<tr>
<td>- Effect of greater reliability on stockholding strategy</td>
<td>- Space utilisation</td>
</tr>
<tr>
<td>- Change in total handling costs</td>
<td>- Time</td>
</tr>
<tr>
<td>- Change in total freight transport costs</td>
<td></td>
</tr>
<tr>
<td><strong>2) Social/environmental impact of UCC vehicle activity</strong></td>
<td></td>
</tr>
<tr>
<td>- Fossil fuel consumption</td>
<td></td>
</tr>
<tr>
<td>- Emissions</td>
<td></td>
</tr>
<tr>
<td>- Congestion</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
General conclusions

- Lack of rigorous evaluation of scheme impacts – more needed
- “New generation” schemes seem to offer potential
- Further work needed on allocation of costs and benefits
- UCC concept seems to be viable given certain pre-conditions
Good practice assessment: Office Depot Consolidation Centre and Electric Vehicles
Part 1

- Trial description
- Impact evaluation survey
“Before” and “after” delivery system

• Original diesel van delivery system studied Feb–March 2009 – with updated information provided 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 in 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 microconsolidation centre for onward delivery by Cargocycles® and electric vans.
Logistics system for deliveries by diesel vans

Logistics system for deliveries by Cargocycles® and electric vans
Standard 3.5t diesel van:
Capacity of 1270 kg and 9 m³
Electrically assisted tricycle capacity of 180 kg and 1.5 m³
Electric van: Capacity of 445 kg and 3 m³
## Impact of changes on distance driven in London, and CO₂

<table>
<thead>
<tr>
<th></th>
<th>BEFORE</th>
<th>Intermediate</th>
<th>AFTER</th>
<th>% change After-Before</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>October 2009</td>
<td>March 2010</td>
<td>May 2010</td>
<td></td>
</tr>
<tr>
<td>Fleet change</td>
<td>7 vans, no cycles</td>
<td>4 vans, 6 cycles, 1 elec van, 1 truck</td>
<td>0 van, 6 cycles, 3 elec vans, 1 truck</td>
<td></td>
</tr>
<tr>
<td>All diesel vans miles/day</td>
<td>322</td>
<td>184</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Truck miles/day</td>
<td>0</td>
<td>34</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Cargocycles + elec van miles / day</td>
<td>0</td>
<td>63</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>Total miles in Greater London / day</td>
<td>322</td>
<td>281</td>
<td>115</td>
<td>-64%</td>
</tr>
<tr>
<td>Miles within the City of London / day</td>
<td>42</td>
<td>89</td>
<td>83</td>
<td>+98% (+350?)</td>
</tr>
<tr>
<td>Miles outside the City of London / day</td>
<td>280</td>
<td>192</td>
<td>32</td>
<td>-89%</td>
</tr>
<tr>
<td>kgCO₂e/ parcel</td>
<td>0.155</td>
<td>0.134</td>
<td>0.058</td>
<td>-62%</td>
</tr>
<tr>
<td>Total miles / parcel</td>
<td>0.282</td>
<td>0.244</td>
<td>0.130</td>
<td>-54%</td>
</tr>
</tbody>
</table>
Progressive impacts of fleet replacement by Cargocycles® and electric vans

Miles/day for all trips

BEFORE

7 vans, no cycles

AFTER

4 vans, 6 cycles, 1 electric van, 1 truck

0 van, 6 cycles, 3 electric vans, 1 truck

Total miles/day

Miles within the City of London

Total kgCO₂e/parcel

November 2009

March 2010

May 2010

-62% CO₂
Impact of vehicle length on kerbside parking occupancy during one day

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

Vehicle length: Diesel van: 5.71m; Electric van: 3.32m, Cargocycle: 2.35m
Consolidation centre close to the City of London
Summary of trial evaluation, part 1
results and impacts

• Mileage is increased in City of London but reduced elsewhere in London

• Confirmed reduction in overall greenhouse gas emissions

• Electric vans are used in addition to Cargocycles for transport of parcels with slight bigger volume

• The trial specific conditions:
  – The type of business is suitable for Cargocycles (parcels, not pallets)
  – Size and weight of parcels are rather small
  – Delivery area in City Centre has a high density of clients
  – A small consolidation centre is available close to the delivery area
Good practice assessment
Part 2

• The consolidation network impact model
• Scenario and analysis
• Recommendations
Modeling the impacts of a network of consolidation centres

- Calculate the before-after impacts using real case data for about 80 variables
- For 18 scenarios, only one variable is assumed to change at a time. Each change corresponds to the question: what would happen if another company would join the network, and the variable changed would be the single difference from the real case of Gnewt.
- For 2 network scenarios, the changes are calculated for adding 4 companies and 4 centres. Scenario A: 4 identical, scenario B 4 different companies.
Examples: extension of the area and extension of the number of vehicles

Objective of this family of scenario: understanding how singular changes in the system of cargocycle introduction influence the whole impacts

### Real case observations and calculations

Real case: B2B parcels deliveries in the City of London

<table>
<thead>
<tr>
<th>REAL CASE</th>
<th>Fleet</th>
<th>% of fleet replacement</th>
<th>Fleet change</th>
<th>Number of vans</th>
<th>Number of cycles</th>
<th>Number of trucks</th>
<th>Cycle per diesel van</th>
<th>Ratio</th>
<th>Rounds/day</th>
<th>Capacity by weight in kg</th>
<th>Total van capacity by weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEFORE REAL</td>
<td>0 vans, no cycles</td>
<td>0</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8830</td>
<td>0</td>
</tr>
<tr>
<td>AFTER REAL</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>0.657</td>
<td>0</td>
<td>0</td>
<td>2400</td>
</tr>
</tbody>
</table>

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**Extension scenario 1: delivery area extended from the City of London to the whole Clear Zone**

Scenario 1: All conditions of business and before-after changes are set identical with Real Case, except for mileage and number of vans, with 784 miles for 16

<table>
<thead>
<tr>
<th>SCENARIO 1</th>
<th>Fleet</th>
<th>% of fleet replacement</th>
<th>Fleet change</th>
<th>Number of vans</th>
<th>Number of cycles</th>
<th>Number of trucks</th>
<th>Cycle per diesel van</th>
<th>Ratio</th>
<th>% change from real case ratio</th>
<th>Rounds/day</th>
<th>Capacity by weight in kg</th>
<th>Total van capacity by weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEFORE</td>
<td>0</td>
<td>16 vans, no cycles</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>20020</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AFTER</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>7</td>
<td>2</td>
<td>0.675</td>
<td>2</td>
<td>0.4375</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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**Extension scenario 2: 200 vehicles through additional identical business in City of London**

Scenario 2: All conditions of business and before-after changes are set identical with Real Case, except 200 diesel vans instead of 7 for BEFORE. Same rate

<table>
<thead>
<tr>
<th>SCENARIO 2</th>
<th>Fleet</th>
<th>% of fleet replacement</th>
<th>Fleet change</th>
<th>Number of vans</th>
<th>Number of cycles</th>
<th>Number of trucks</th>
<th>Cycle per diesel van</th>
<th>Ratio</th>
<th>% change from real case ratio</th>
<th>Rounds/day</th>
<th>Capacity by weight in kg</th>
<th>Total van capacity by weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEFORE</td>
<td>0</td>
<td>200 vans, no cycles</td>
<td>200</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>254000</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AFTER</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>168</td>
<td>85</td>
<td>18</td>
<td>0.84</td>
<td>-2</td>
<td>0.425</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
Example distance

- The total distance driven by all vehicles in Greater London before and after the introduction of the new fleet and consolidation centre network
- Impacts of further scenarios after changes are calculated in % change, compared to real case before

<table>
<thead>
<tr>
<th>Total distance in miles per day</th>
<th>Distance</th>
<th>Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance all diesel vans (46 mi/round)</td>
<td>Distance all cycles (4.5 mi/round)</td>
<td>Distance all elec vans (4.5mi/round)</td>
</tr>
<tr>
<td>322</td>
<td>0</td>
<td>54</td>
</tr>
</tbody>
</table>
Changes are expressed as % of before

\[ C = \left( \frac{A \times 100}{B} \right) - 100 \]

with:

\[ C = \% \text{ change between before and after expressed as } \% \text{ of before} \]

\[ B = \text{ before: with 100\% diesel vans} \]

\[ A = \text{ after: with 100\% electric vans and micro-consolidation centre(s)} \]
## Total distance in London

<table>
<thead>
<tr>
<th>Distance all diesel vans (46 miles/round)</th>
<th>Distance all cycles (4.5 mi/round)</th>
<th>Distance all elec vans (4.5mi/round)</th>
<th>Truck distance</th>
<th>Total distance vans+ clean vehicles+ truck</th>
<th>% change in total distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>784</td>
<td>0</td>
<td>126</td>
<td>63</td>
<td>76</td>
<td>784</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>265</td>
<td></td>
<td></td>
<td></td>
<td>-66 Clear Zone</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distance all diesel vans (46 mi/round)</th>
<th>Distance all cycles (4.5 mi/round)</th>
<th>Distance all elec vans (4.5mi/round)</th>
<th>Truck distance</th>
<th>Total distance vans+ clean vehicles+ truck</th>
<th>% change in total distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>9200</td>
<td>0</td>
<td>1512</td>
<td>765</td>
<td>684</td>
<td>9200</td>
</tr>
<tr>
<td></td>
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<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-68 200 veh</td>
</tr>
</tbody>
</table>
Total distance driven in London according to various scenarios

Real case
Scenario 1: Clear Zone extension
Scenario 2: 200 diesel vans instead of 7
Scenario 3: + 61% kg/parcel; 100% load factor by weight
Scenario 4: Minus 47% of kg/parcel
Scenario 5: + 71% vol/parcel; 100% load factor by volume
Scenario 6: Minus 47% vol/parcel
Scenario 7: Minus 47% of kg/parcel and vol/parcel
Scenario 8: 200 vehicles; - 47% kg/parcel; -47% vol/parcel
Scenario 9: + 100% more stops
Scenario 10: + 200 % more stops
Scenario 11 + 10% more parcels/day
Scenario 12: + 25% load weight and vol/parcel/day
Scenario 13: + 25 % km for cycles AFTER
Total distance driven in London

Impacts of scenarios, after changes, in % compared to real case BEFORE changes = e.g. adding other types of businesses

- Scenario 14: - 25 % km for cycles AFTER
- Scenario 15: -25% distance depot to delivery area
- Scenario 16: +25% distance depot to delivery area
- Scenario 17: 37.5% Cargocycles, 62.5% electric vans
- Scenario 18: No Clean Vehicles AFTER, micro-consolidation only
- Microconsolidation network scenario A adding 4 identical businesses
- Microconsolidation network scenario B adding 4 different businesses

Made possible by the INTERREG IVC programme
Real case

Change in total CO₂ emissions in London

- 200 diesel vans instead of 7
  + 61% kg/parcel; 100% load factor by weight BEFORE
  - 47% of kg/parcel
  + 71% vol/parcel; 100% load factor by volume BEFORE
  - 47% vol/parcel
  - 47% of kg/parcel and vol/parcel
  200 vans; - 47% kg/parcel; -47% vol/parcel
  + 100% more stops
  + 200 % more stops
  + 10% more parcels/day
  + 25% load weight and vol/parcel/day
  + 25 % km for cycles AFTER
  - 25 % km for cycles AFTER
  -25% distance depot to delivery area
  +25% distance depot to delivery area
  37.5% Cargocycles, 62.5% electric vans
  No Clean Vehicles AFTER, micro-consolidation only
  Microconsolidation network scenario A
  Microconsolidation network scenario B
Potential sectors (scenario B)

- Parcel services in B2B and B2C business, home deliveries to households
- General cargo logistics
- Stationery
- Clothes
- Fruit and vegetables
- Restaurants, pubs, and bars
- Administration and service offices
Recommendations

1. Facilitate a higher market share for electric freight vehicles
2. Test new loading space
3. Avoid PCNs for clean vehicles
4. Observe and monitor changes
5. Improve coordination
6. Authorities should not take operating responsibility for a consolidation centre
7. Cooperate with research and maintain expert knowledge on clean vehicles and consolidation
Concluding remarks

• Most scenarios show reductions in:
  – overall distance travelled
  – emissions
  – Kerbspace (loading) requirements.
• Challenge: growth in distance in inner-city area
• Private benefits for the company:
  – ability to react more quickly to customer requests
  – more targeted approach to certain delivery areas
  – improved image and positive public relation effects