Develop environmentally friendly and efficient solutions for freight distribution in the center of Oslo.
Green Urban Distribution (2012-2014)

Vision: Zero emissions in urban goods distribution

Main objective:
To develop environmentally friendly and efficient solutions for urban freight distribution in Oslo.

Secondary objectives:
M1 Develop solutions for better use of road spaces
M2 Develop solutions for better use of day and week time
M3 Demonstrate usage of environmentally friendly and energy efficient vehicles in unmanned deliveries.
Green Urban Distribution

- **What**: research project aimed at identifying and demonstrating green and efficient solutions for urban freight distribution through
  - Improved organization
  - Service innovation
  - Technology

- **Who**: SINTEF Technology and society, the Municipality of Oslo, Institute of Transport Economics, the Norwegian Public Roads Administration, and several industry partners (goods owners, transport organizations, carriers, vehicle and technology suppliers)

- **How**: funded by The Regional Research Fund in Norway
Oslo

- Capital of Norway

- 650,000 inhabitants, increase by 30% by 2030
- Freight distribution increase by 50% by 2030

- Pollution and local emissions – especially wintertime
Project plan

AP1: Project management

AP2: International study

AP3: User needs

AP4: Measures

AP5: Evaluation

AP6: Business models

AP7: Demonstrator
d1: 2012
d2: 2013-2014

AP8: Dissemination

2012-2014
Urban freight transport

• Crucial for living cities and the economic system

• Characterized by
  – Lack of coordination
  – Inaccessible and unavailable loading bays
  – Ineffective stock receipts
  – Improvised solutions

• These challenges result in inefficient distribution and increased emissions
Stakeholders in urban distribution

**Shippers**
- Wholesaler
- Manufacturer
- Retailer chain

**Carriers**
- Subsidiaries
- Independent carriers
- Consolidation carriers

**Local authorities**
- Planning and building
- Labor inspection
- Food safety
- Policy
- Parking
- Maintenance

**End-receivers**
- Retailers
- Stores, malls
- Dining places
- Hotels
- Public institutions
- Industrial sites
- Construction sites

**Urban distribution**
"the last mile"
Stakeholder survey

• 67 responses from carriers, receivers and authorities
• Invited by e-mail with link to web survey

• Asked to assess consequences of 7 selected measures
• Scale from -2 to 2
  (from very negative consequences to very positive consequences)

• Could also comment on every measure
Finding effective measures

• Successful measures must be
  – adapted to the local context of the city center of Oslo
  – in accordance with stakeholder concerns
  – economically viable
  – effective in terms of reducing emissions
Overall survey results

30.09.2013
Green Urban Distribution
Demonstration (d1) – pilots 2012

- Environmentally friendly vehicles tested in Bring Express' logistics system in the centre of Oslo
- Focus on optimization of route, battery capacity and load factor
- Development of evaluation method using measurements to assess the effect / impact of the measures (good data quality is important)
Evaluation framework

- Survey results serve as an input to demonstration 2 (d2) in the project – which measures to demonstrate.

- The demonstrator will be carried out the coming winter/spring.

- The demonstrator will be evaluated with a universal framework design.

- Four impact areas – transport, economics, environment and society.

- 20 indicators.
**Evaluation of demonstration 1 (d1)**

- (d1) tested 5 environmentally friendly distribution vehicles

<table>
<thead>
<tr>
<th>Transport</th>
<th>Economics</th>
<th>Environment</th>
<th>Society</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Battery for one day</td>
<td>• No differences</td>
<td>• - 0.17 kg CO$_2$ per km</td>
<td>• High acceptance</td>
</tr>
<tr>
<td>• Save 4.8 l diesel/ day</td>
<td></td>
<td>• - 0.49 kg NO$_x$ per km</td>
<td>• High employee satisfaction</td>
</tr>
</tbody>
</table>

30.09.2013

Green Urban Distribution
Demonstration (d2), spring 2014

• Urban consolidation centre
  • Consolidated shipments to end-receivers in designated area inside or outside the city centre

• Distribution
  – Last mile distribution by electric bicycle or electric van
  – Limited access to designated area for a selection of vehicles

• Security measures limiting access for larger vehicles

• Vital questions:
  – Where should such a centre be located?
  – Who should responsible for operating the centre?
  – Who should be responsible for last mile distribution?
Conclusion

• Finding successful measures requires identifying common ground

• Win-win vs. suboptimal outcomes

• Knowledge on effects of different measures

• Cooperation between commercial actors and public authorities
Sustainable distribution of goods requires cooperation between public authorities, transporters, goods owner, customers, technology and vehicle suppliers and research institutions.

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