German Environment Agency

Climate Action in Transport Conference

Urban Freight and Logistics: Driver of sustainable mobility in cities?

Tim Schubert
Section I 3.1
Environment and Transport
Urban Freight and Logistics: Driver of sustainable mobility in cities?

Structure

INTRODUCTION

HYPOTHESIS I  Urban freight is efficient, but has a disproportionate impact on the environmental quality in cities.

HYPOTHESIS II  Current trends will reshape urban freight, but also increase the amount of vehicles and goods on the streets.

HYPOTHESIS III  Implementing new ideas can make urban freight more sustainable, but the legal and economic conditions must be favorable.

UPSHOT
German Environment Agency

Central environmental authority in Germany

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

Topics (selection):
- Climate protection and adaptation
- Clean air, water and soil
- Waste avoidance and eco-design
- Chemicals and pesticide approvals
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Introduction

“The delivery of consumer goods (not only by retail, but also by other sectors such as manufacturing) in city and suburban areas, including the reverse flow of used goods in terms of clean waste.” (OECD 2003)

Sources: By Kora27 – Own Work, CC-BY-SA 4.0; Norbert Schnitzler – Own Work, CC BY-SA 3.0; Groupe NOVEA - Own work, CC BY-SA 3.0; Rudolf Stricker - Own work (own photo), CC BY-SA 3.0; Walmart from Bentonville, USA - Walmart’s Aerodynamic Trucks, CC BY 2.0
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**Hypothesis I: Environmental Impact**

Urban freight is efficient, but has a disproportionate impact on the environmental quality in cities.

Source: schaltwerk / Fotolia.com
Environmental impact of urban freight transport in Germany

WHAT IS THE SHARE OF FREIGHT TRANSPORT IN BUILT-UP AREAS?

Data for 2016, Source: TREMOD 5.71 (09/2017)
Commercial vehicles are responsible for a disproportionately high share of particulate matter emissions from transport in cities.
Commercial vehicles are responsible for a disproportionately high share of particulate matter count, which indicates a high amount of harmful fine and ultrafine particulate matter (PM$_{2.5}$).
Environmental impact of urban freight transport in Germany

NITROGEN OXIDES (NO\textsubscript{X})

Commercial vehicles are responsible for a disproportionately high share of nitrogen oxide emissions in cities, but it is already decreasing in relative and absolute terms.
Environmental impact of urban freight transport in Germany

CARBON DIOXIDE (CO₂)

Commercial vehicles must contribute to the goal of greenhouse gas neutrality by the middle of the century according to Germany’s Climate Action Plan 2050.
### Environmental impact of urban freight transport in Germany

**NOISE**

**In the past 12 months how often have you felt disturbed or stressed by noise from these sources? (in Germany)**

- **Road-traffic noise**
  - Extreme: 8
  - Strong: 15
  - Moderate: 25
  - Some: 28
  - Not at all: 24

- **Noise created by neighbors**
  - Extreme: 5
  - Strong: 9
  - Moderate: 17
  - Some: 28
  - Not at all: 40

> 76% say that they have felt disturbed or stressed by road-traffic noise in the past year.

> At 50 kph on a major road, an HGV is 6 to 10 times as loud as a car.

Source: Umweltbewusstsein 2016 / Umweltbundesamt
Hypothesis II

Current trends will reshape urban freight, but also increase the amount of vehicles and goods on the streets.

Source: Kara / Fotolia.com
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Trends affecting urban freight (selection)

Sources: By SounderBruce - Own work, CC BY-SA 2.0; Superbass - Own work, CC BY-SA 4.0; Eduardofamendes - Own work, CC BY-SA 4.0; Scott Lewis - own Work, CC BY 2.0; Louise.ward - Own work, CC BY-SA 4.0
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Growing number of shipments by courier, express and parcel services

CHANGES IN CONSUMER BEHAVIOR: E-COMMERCE

Source: Own work, Data: BIEK (2017) KEP-Studie 2017
Hypothesis III

Implementing new ideas can make urban freight more sustainable, but the legal and economic conditions must be favorable.

Source: Amac Garbe / DLR
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(Old) and New Ideas

- Avoid
  - Shift
    - Cargo Bikes
    - Urban Consolidation Centers
    - Crowd Delivery
    - (Mobile) Micro Hubs
  - Freight Demand Management
  - Click&Collect
  - Intelligent Transportation Systems
- Improve
  - Optimized Routing
  - Electric Cars
  - Delivery Shops & Package Stations
- Fuels
  - Electric Cars
  - Fuels
### Policy approaches to promote sustainable urban logistics

#### WHAT MEASURES HAVE ALREADY BEEN IMPLEMENTED TO IMPROVE URBAN FREIGHT? (EXAMPLES)

<table>
<thead>
<tr>
<th>Category</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal</td>
<td>• Increased policing of existing rules</td>
</tr>
<tr>
<td></td>
<td>• Spatial access restrictions</td>
</tr>
<tr>
<td></td>
<td>• Restriction of delivery times</td>
</tr>
<tr>
<td>Organizational</td>
<td>• Inclusion of private actors in freight traffic planning, contact person for freight transport</td>
</tr>
<tr>
<td></td>
<td>• Dynamic traffic information services</td>
</tr>
<tr>
<td>Economic</td>
<td>• Support scheme for low-emission vehicles</td>
</tr>
<tr>
<td></td>
<td>• Promotion of off-hour delivery (7pm – 6am)</td>
</tr>
<tr>
<td></td>
<td>• City/congestion charging</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>• Consideration of freight in spatial planning</td>
</tr>
<tr>
<td></td>
<td>• Urban consolidation centers/Micro-hubs</td>
</tr>
<tr>
<td></td>
<td>• Loading areas</td>
</tr>
</tbody>
</table>

*But:* Experience from pilot projects shows: Incentives alone are not sufficient and regulatory intervention is often necessary.
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Policy approaches to promote sustainable urban logistics


By Schaarschmidt (2011), Müller-Steinfahrt (2016)

Lack of willingness to participate (retail companies)
- Less affected by problems, benefits not obvious

Policies need to
(1) promote cooperation by focusing on receivers, too, and
(2) improve economic viability by changing the calculation,
i.e. balance the additional cost through incentives and regulation

Level of service not guaranteed
- Consolidated delivery leads to bottleneck at the recipient, insufficient shipment data transmission

Lack of interest at the local government level
- Change in local politics, low priority, lack of resources, lack of initial funding
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Good practice in Germany, Denmark and the United States

URBAN DISTRIBUTION CENTERS AND E-TRUCKS

Aim: Avoid by consolidation

Where: Copenhagen

Source: © citylogistik-kbh.dk
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**Good practice in Germany, Denmark and the United States**

**URBAN DISTRIBUTION CENTERS AND E-TRUCKS**

**E-CARGO BIKE COURIER**

**Aim:** Shift

**Where:** 8 cities in Germany

Source: Amac Garbe / DLR
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Good practice in Germany, Denmark and the United States

URBAN DISTRIBUTION CENTERS AND E-TRUCKS

E-CARGO BIKE COURIER

SMART ROUTING WITH GEO-FENCING

Aim: Improve
Where: Berlin

Source: Own work, © OpenStreetMap contributors
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Good practice in Germany, Denmark and the United States

URBAN DISTRIBUTION CENTERS AND E-TRUCKS

E-CARGO BIKE COURIER

SMART ROUTING WITH GEO-FENCING

MICRO-HUBS AND CARGO-BIKES

Aim: Avoid and Shift
Where: Hamburg (and other cities)

Source: © 2015 United Parcel Service of America, Inc.
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**Good practice in Germany, Denmark and the United States**

- **URBAN DISTRIBUTION CENTERS AND E-TRUCKS**
- **E-CARGO BIKE COURIER**
- **SMART ROUTING WITH GEO-FENCING**
- **MICRO-HUBS AND CARGO-BIKES**
- **OFF-HOUR DELIVERY WITH INCENTIVES**
  - **Aim:** Avoid and Improve
  - **Where:** New York City

Source: By Takashi Hososhima from Tokyo, Japan - Delivery service truck, CC BY-SA 2.0
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The Upshot

**HYPOTHESIS I:** Urban freight is efficient, but has a disproportionate impact on the environmental quality in cities.

*Cities and national governments need to act to make urban freight transport more sustainable.*

**HYPOTHESIS II:** Current trends will reshape urban freight, but also increase the amount of vehicles and goods on the streets.

*The growth of E-commerce and new business models increase the pressure to act now.*

**HYPOTHESIS III:** Implementing new ideas can make urban freight more sustainable, but the legal and economic conditions must be favorable.

*Adoption of new, sustainable concepts for urban freight must be accelerated by both incentives and regulation.*
Thank you for your attention!

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