Green Logistics

Comparability of the Environmental Effects of Logistics Services

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Green Logistics – Partners & Project goals

**Project Partners**

- Deutsche Post DHL
- UPS
- Lufthansa Cargo
- DB Schenker
- ARCADIS
- Vanderlande
- Schenker
- Fraunhofer
- Goodman
- FIEGE
- TÜV Rheinland
- Wuppertal Institut für Klima, Umwelt, Energie GmbH

**Transparency & Comparability**

- Development of assessment methods for the whole logistics chain (transport, transshipment, warehousing)
- Definition of key figures on energy and resource consumption
- Creation of certificate for green logistics service providers

**Discussion and expertise via Stakeholder Group**

i.a.

- Audi
- BIBA
- CAPTRAIN
- CONTARGO
- Dr. Oetker
- Daimler
- Hapag-Lloyd
- Kühne
- Metro Logistics
- ThyssenKrupp
- HP
- EVONIK
- Green Freight Europe

**Green Levers, Products & Services**

- Conception and realization of various levers with focus on
  - Piece goods and packages
  - Cargo via road, rail and air
  - Logistics real estates and intra-logistics


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## The »Green Logistics« approach for sector guidance

// Identification of relevant processes and sources of emissions from logistics services

// Definition of relevant emission categories:
- Transport (all modes): freight transport, provision of transport means & containers, ...
- Logistics sites: intralogistics, material consumption, real estate, ...
- System-wide sources: administration, commuting, business travel

// Definition of relevant environmental effects:
- CO$_2$e, energy, SO$_2$, NOx, CO, HC
- Noise, land consumption, particulate matters
Central requirements for »Green Logistics« approach

1. Realization of comparable results for comparable logistics services
   - Step 1: Screening and definition of assessment scope
   - Step 2: Ecological assessment of logistics service

2. Meaningful results and applicability for large as well as for small companies
   - Assessment of Scope 1, 2 and 3 (i.e. own and subcontracted processes)
   - Use of real process data \(\rightarrow\) “close to reality”
   - Use of default values \(\rightarrow\) “simplifications if reasonable”

3. Definition of comprehensive set of relevant default values
   - Alignment with existing data bases & current initiatives
   - Development of new parameters e.g., at logistics sites (warehousing, transshipment), for auxiliary processes
Identification of assessment scopes for logistics services (»system definition«)

Recommendation of industrial partners

Relevance analysis by means of detailed studies, model calculation and literature study

- General significance
- Option for differentiation
- Potential for optimization
- Requirements of market and legislation

Not relevant:
- Today’s availability of data within
  - Companies
  - Public databases

«Green Logistics System Definition«

(1) Published on green-logistics-network.com
Relevant emission sources for the comparison of different logistics services (and companies)

- Road transport
  - All means of transport and legs (company-owned & external vehicles)
  - Direct emissions of vehicle propulsion and ancillary services and emissions of leakage (additives, refrigerants) for all loaded and empty trips made by each vehicle
  - Indirect emissions of production/provision of fuels, vehicles and infrastructure

- Rail transport
  - All warehouses and transshipment centers for the goods handling [storing, conveying, packaging, …] (company-owned & external)
  - Direct emissions of engines (e.g., yard logistics)
  - Indirect emissions of the purchase/provision of fuels, energies and auxiliaries (e.g., packaging materials)
  - Indirect emissions for the production of logistics facilities

- Maritime transport
  - Energy consumption (e.g., electricity, heating)

- Inland waterway transport
  - Direct emissions of regular travel between one's place of residence and place of work

- Air transport
  - Direct emissions of company-specific business travels
1. Screening phase
   Analysis of relevance of sub-processes and definition of assessment scope and level of detail

   Less relevant sub-processes
   (<1%, \(\sum\) max. 5%)

2. Ecological assessment of relevant sub-processes (≥1%)
   2.1 Emission calculation
       3 approaches (level of detail) for 6 environmental impacts:
       company specific / distance related / default values
   2.2 Validation of screening phase
       (<1%, \(\sum\) max. 5%)

3. Allocation
   Identification of emissions per logistics service, client, organizational or geographical unit

4. Declaration
   Standardized communication of environmental impacts

Certification\(^{(1)}\)

LS = Logistics service; OU = Organizational unit; CL = Client; Geo = Geographical unit.
MJ = Mega joule; \(\text{CO}_2\)\text{e} = \(\text{CO}_2\)-equivalents;
\(\text{NO}_x\) = Nitrogen oxides; \(\text{SO}_2\) = sulfur dioxide;
\(\text{CO}\) = carbon monoxide; \(\text{HC}\) = hydrocarbons

\(^{(1)}\) optional
The »Green Logistics Method« defines minimum standard, higher levels of detail are optional.

Reasons for a more detailed approach (i.e. more company-specific) e.g.,

- Detailed objectives of assessment results and reporting (e.g., for customers)
- Requirements of stakeholders/shareholders
- Access to activity data
- Monitoring of improvement measurements/results
Screening phase (1st step), definition of assessment scope

// Fictional example

<table>
<thead>
<tr>
<th>Logistics service provider (LSP)</th>
<th>LS 1</th>
<th>LS 2</th>
<th>...</th>
<th>LS n</th>
</tr>
</thead>
</table>

### Step 1

- a. General check of relevance
- b. Emission calculation by means of industry-average values

<table>
<thead>
<tr>
<th>Emission categories(^{(1)})</th>
<th>Relevance</th>
<th>Share</th>
<th>Share (acc.)</th>
<th>?</th>
</tr>
</thead>
<tbody>
<tr>
<td>int 987 kg CO(_2)e</td>
<td>29.8 %</td>
<td>100.0 %</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>ext 876 kg CO(_2)e</td>
<td>26.4 %</td>
<td>70.2 %</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>int 765 kg CO(_2)e</td>
<td>23.1 %</td>
<td>43.8 %</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>654 kg CO(_2)e</td>
<td>19.7 %</td>
<td>20.8 %</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>23 kg CO(_2)e</td>
<td>0.7 %</td>
<td>1.1 %</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>12 kg CO(_2)e</td>
<td>0.4 %</td>
<td>0.4 %</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>LS 3,317 kg CO(_2)e</td>
<td>100 %</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Threshold rule:
- less than 1 %
- sum less than 5 % of total emissions

\(^{(1)}\) Listed emission categories are exemplary.
Allocation model (simplified)

1. Calculated emissions for less relevant sub-aspects
   - General emissions
   - Emissions of logistics nodes
   - Emissions of transport processes

2. Calculated emissions for relevant sub-aspects
   - Emissions of warehousing nodes
   - Emissions of transshipment nodes
   - Emissions of freight transport processes

3. Allocation to defined sub-sets of emissions
   - Emissions of passenger transport processes
     - e.g. CO₂ emissions per tons-km, tons transshipped, tons stored refrigerated

3.1 Allocation to defined logistics items
   - Emissions per ...

3.3 Allocation to defined allocation objectives
   - e.g. clients
     - 1
     - 2
     - 3
     - ... n

LS = Logistics service; OU = Organizational unit; CL = Client; Geo = Geographical unit
Declaration and certification (optional)

// Standardized blank form for result declaration currently under development
- Developed by TÜV Rheinland and industrial partners
- Consensus needed between requirements of industries and certification process

// General agreement
- Testifying correct use of methodology
- Embedded in existing environmental schemes (DGNB, ISO 14001, EMAS etc.)
- Share of real activity data (to be valid as of 2020)
  - 80 % approach A/B for all scopes 1-3
  - Max. 20 % approach C
- Declaration of values for continuous development of industry-averages (needed in approach C)
Development of comprehensive approach: Guidance and industry examples

Electricity measurements at logistics nodes
- Container terminals (ship/rail/road)
- Warehouses, parcel/letter distribution centers

Screening phase (Step 1)
- Definition of assessment scopes for logistic networks

Calculation of emissions on basis of approach A, B & C and allocation of emissions on client/customer level
- Country networks
- Spotlights at warehouses

Development of parameters and key figures (examples)
- Pre/on-haulage for combined transport
- Intralogistics processes
- LCA of building shells
// Green Logistics method further develops existing approaches of ecological assessment for logistic systems
- All relevant processes are covered (transport, transshipment, storage)
- Additional environmental effects are included (e.g., local air pollutants)
- Complete yet pragmatic approach is outlined (2-step approach)

// Still, alignment and consolidation of current activities is necessary and started in Green Logistics. This includes
- Methodological approaches
- Data sets for default values

// Further reading (English)
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