City logistics environmental decision support-system: Moving towards decarbonized urban freight transport

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Introduction

Ecologistics

Low carbon freight for sustainable cities
“How to strengthen relationships between the industry and cities to improve the ability to use carbon as a meaningful climate-tracking mechanism and define low emission development pathways with collaborative actions? “
Methodology

- Desktop Research
- Field Research
Global Adoption of the GPC

35 Cities pilot tested the GPC

70+ Other cities used the GPC beta versions

1,000+ Other potential cities (C40 & ICLEI members)

www.climateprotocol.org/city-accounting
Communities of practice

1. Reasons for measuring UFT GHG emissions
2. There is more to road urban freight transport
3. Capturing the full climate impact of fuel use
4. Lack of data and data collection complexity
5. Effective data-driven dashboards for decision making
6. Impact assessment of common emission reduction strategies
7. Not just greenhouse gases

SUSTAINABLE MOBILITY EXPERTS
SOFTWARE DEVELOPERS
URBAN PLANNING EXPERTS
CARBON ACCOUNTING EXPERTS
EcoLogistics Tool

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**Scope:**

- **Kyoto Protocol**
- **IPCC, GHG Protocol**
- **Scopes**
- **Emissions Life-Cycle**
- **Logistics coverage**
- **Accounting methods**
- **Reporting**
Resulting methodology

Fuel details
- Fuel type (diesel, gasoline, CNG, LNG etc.)
- Quantity of fuel (in liter, gallon, kg)
- Fuel emission factor (g CO₂/kWh)

Transport mode details
- Share of transport mode
- Type of vehicle
- Number of vehicles
- Payload
- Load factor

Activity details
- Choice of transport mode
- Average trip length
- Number of trips
- Total distance travelled

Calculation approach
- Direct emissions (Scope 1)
- Indirect emissions (Scope 2 & 3)

Full energy life cycle emissions (Well-to-Wheel)
- Emissions from fuel production & distribution (Well-to-Tank)
- Emissions from fuel combustion (Tank-to-Wheel)

Mode of transport
- Road
- Rail
- Inland waterway
- Air
- Other logistics activities

Fuel-based approach

Activity-based approach
Experimental setting

- Multi-layer, multi-actor approach capture freight patterns:
  - Statistical sources,
  - existing policy documents and plans,
  - previous technical studies,
  - surveys carried out among.

### Demographic and economic characteristics
- The size, density and GDP of project cities

### GHG emissions from the transport sector
- Emission reduction targets and strategies
- Existing freight-related regulations and measures

### Urban freight transport fleet
- The share of freight vehicles in the registered vehicle fleet
- The share of freight vehicles by vehicle type
- The share of freight vehicles by vehicle age
- The share of freight vehicles by fuel type
- Urban freight traffic flows
- Vehicle kilometers travelled
- Road freight activity in terms of tonne-kilometer
- Utilization of vehicle capacity

### Environment and energy aspects
- Fuel consumption in terms of liters per 100 kilometers
- Baseline CO₂ e emissions from urban freight transport
- Projections for CO₂ e emissions from urban freight transport in the BAU scenario
- Projections for CO₂ e emissions from urban freight transport in the target scenario

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**Step 1**
**Fill in the baseline data**
- Start with entering your baseline data in the road tab, rail tab and inland waterways tab

**Step 2**
**See the baseline results**
- The basic data will then allow you to estimate the emission performance of urban freight using CO₂ and CO₂ e values in the results tab

**Step 3**
**Project GHG emissions**
- You will gain insight into your fleet’s future emissions from road freight transport in the forecast tab

**Step 4**
**View your options**
- You will be able to review possible technologies and strategies and its potential emission reductions
Results and discussion

2019 vehicle activity and the fuel used data collected from the surveys

Baseline essential:
- Cities to define the LCAPs
- Cities to understand the potential reductions
- Pilots within the city to estimate and track the GHG emissions
Conclusions and future research

- Decarbonizing city logistics a top priority
- Sustainable economic growth: governments and industry collaboration
  - To plan a credible and high-impact greenhouse gas emissions reduction strategy
  - Improve the ability to use carbon as a meaningful climate-tracking mechanism and decision making tool
- Existing city GHG logistics emissions methodologies are overly complex and do not involve the industry
- First methodology for harmonizing GPC and GLEC
- **First DSS for policymakers** to track and assess carbon projections and identify reduction strategies
- Flexibility vs paucity
  - Initiate actions
  - Improve level of specificity and decision making accuracy
Methodologies:


EcoLogistics Ecologistics Self-Monitoring Tool:
