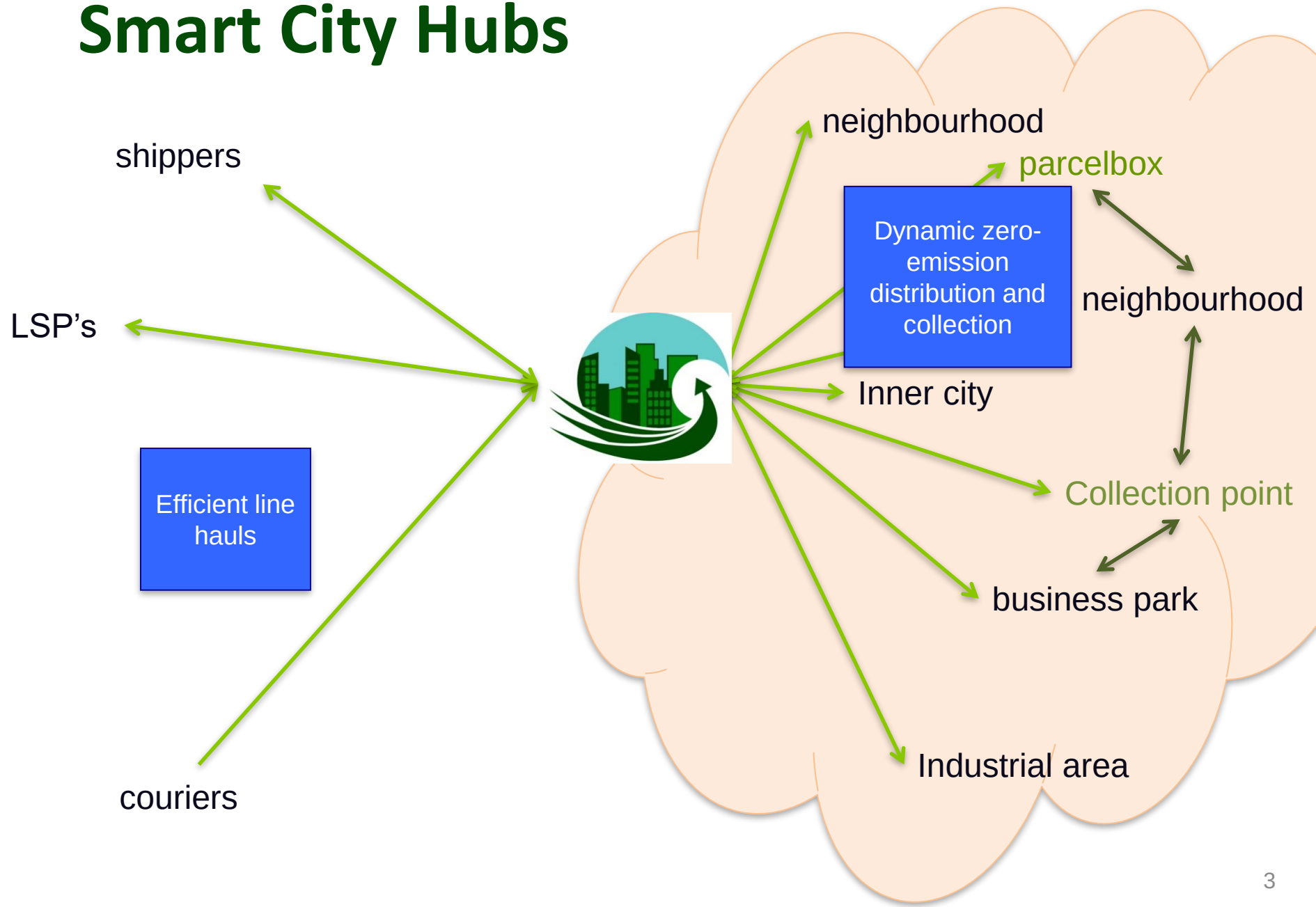

SmartCity
Hubs

Developing Public-Private cooperation in open Smart City Hubs in Europe

IPIC 4-7 July 2017

Birgit Hendriks, Eco2city

Smart City Hubs



Our ambition was and still is..

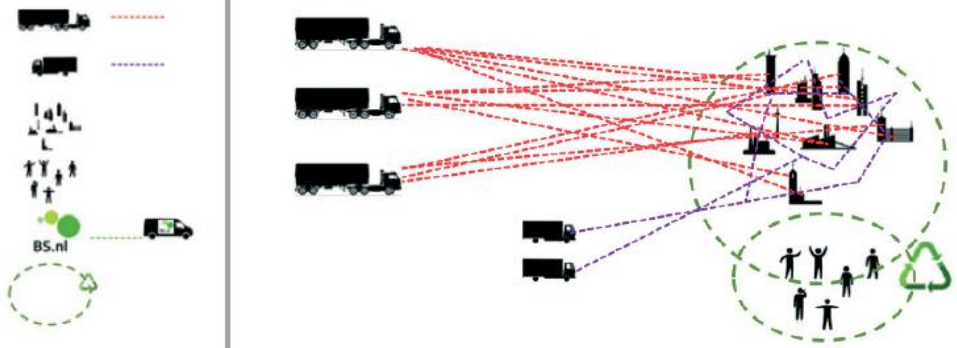
to design a new system for city distribution and –

collection that is economically, environmentally and

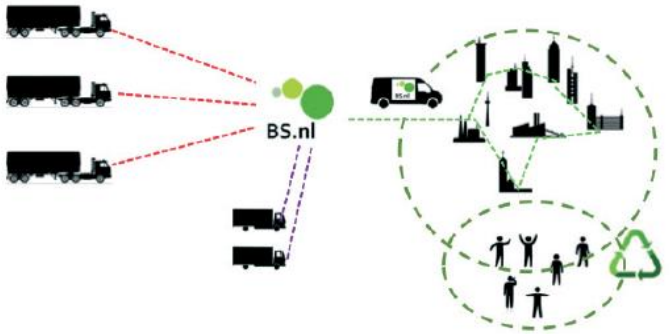
socially efficient and sustainable

9 years of experience
The Dutch Binnenstadservice

Situation without Binnenstadservice



Collective receiving point for shopkeeper: Binnenstadservice



Integrated parallel actions

- The ‘Triple P and Triple X’ solution is a novel integrated approach to make Smart City Hubs work for the cities and create the impact that is needed.

- The parallel working on both the private and the public side combined with the parallel working on both upstream and downstream in the supply chain

- This approach is born out of experience. Test this in your research!

‘All inclusive’ solution

- Experience has learned that shippers/carriers need an ‘all inclusive’ solution: the ‘triple X Smart City Hubs’ solution to make the impact in cities grow. The Triple X is what the industry side will take up and deliver
- The governments in the project will create the trigger for the industry stakeholders to change their logistic behaviour, ‘the triple P for municipalities’

What the private site delivers: City Logistics Triple X

1. Physical X-dock: space for operations

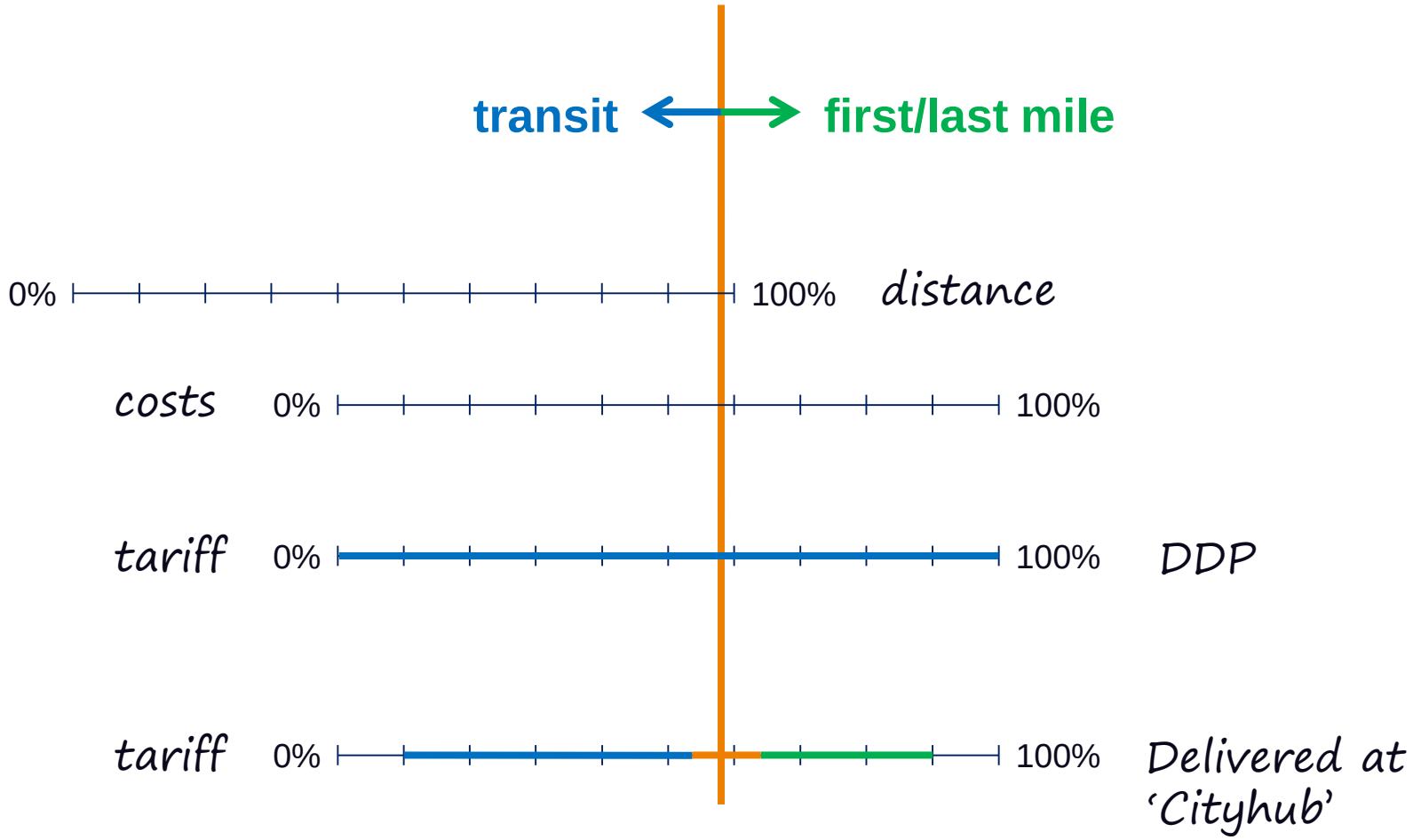
2. Financial X-dock: new contracts

3. Virtual X-dock: IT platform

Financial X-dock: contracts, commercial terms

- **“the last mile”** is only a few miles, but **very costly** (40% of transportation costs)
- Decouple costs and benefits at the edge of the city
- Possibilities for bundling of deliveries creates lower price per stop
- End receivers should be able to ask for a city logistic Incoterm, creating a better fit with their demands

Financial X-dock: contracts and commercial terms



Incoterms©

- The legacy of Koen Vanheusden, head of Trade agency Flanders. Member of the Incoterm committee 2020

- https://youtu.be/-1Tw9zlIY7U?t=10m21s

wholesale trade vs. retail

Raising the efficiency of the LaMiLo

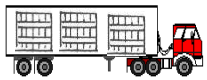
SmartCity Hubs

risk
revenue
payment

consolidation by seller

consolidation by buyer

2 carriers



consolidation by seller

dispatching by seller

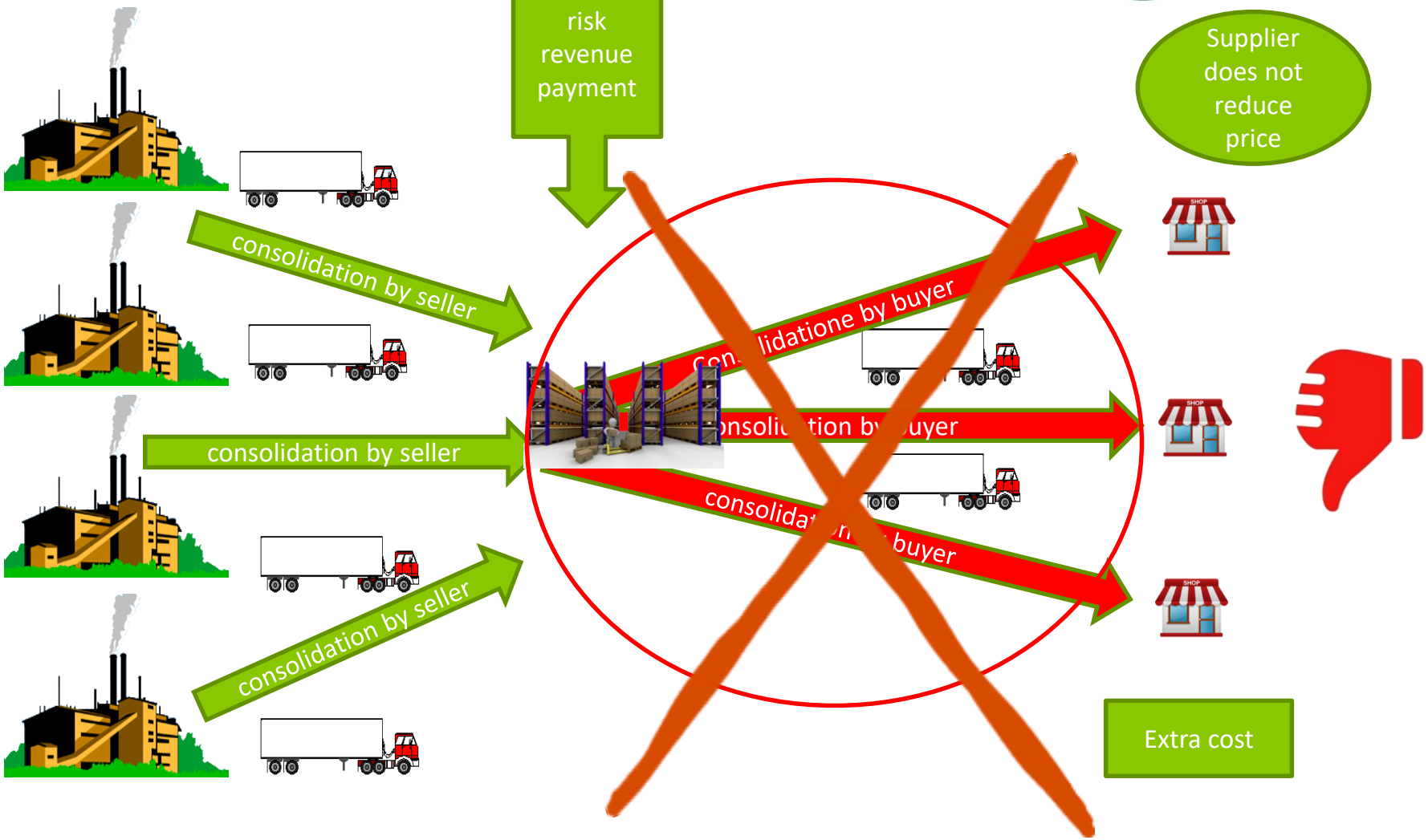
1 carrier

risk
revenue
payment

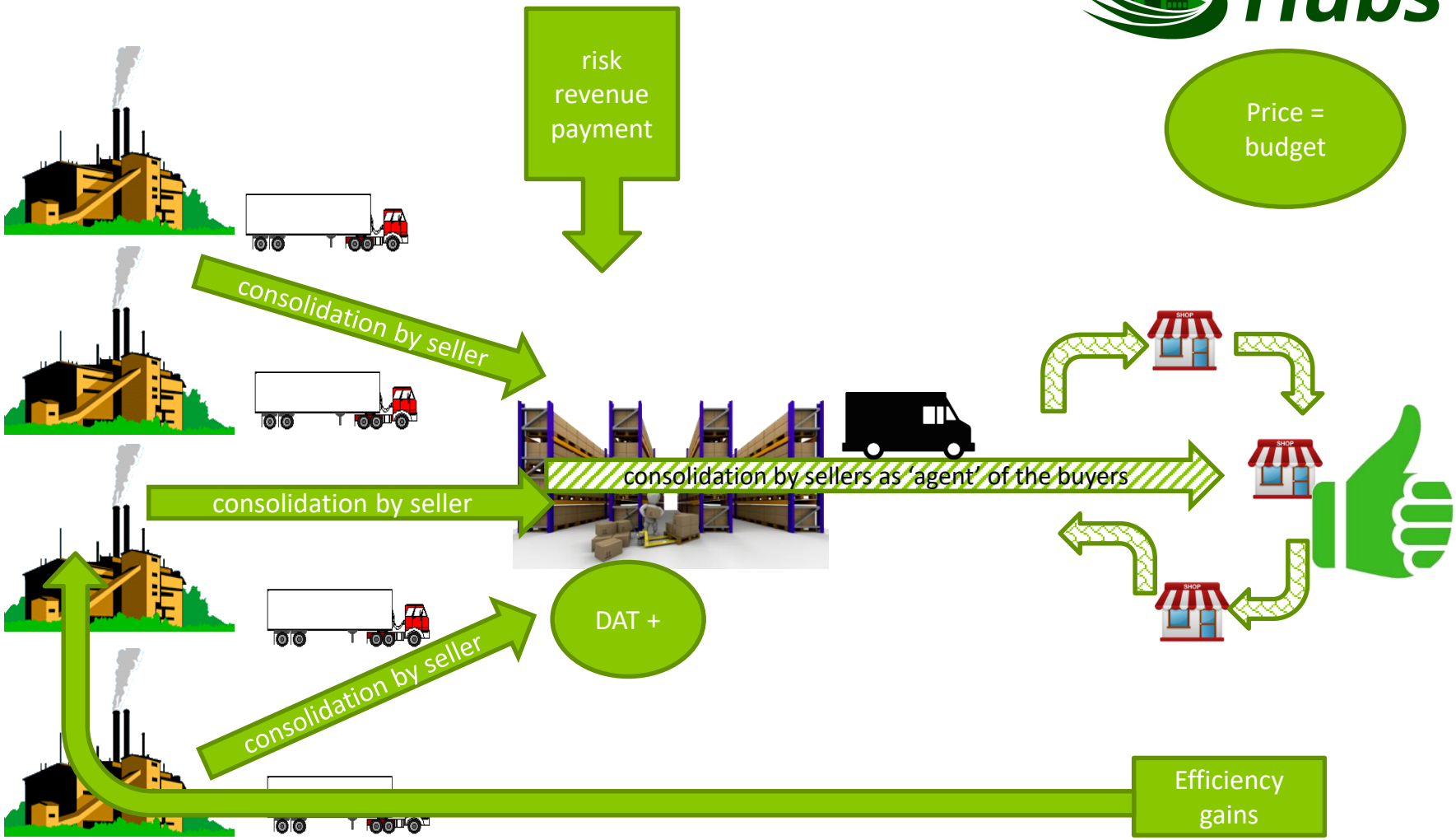
DDP
DAP
Free
House

price
= budget

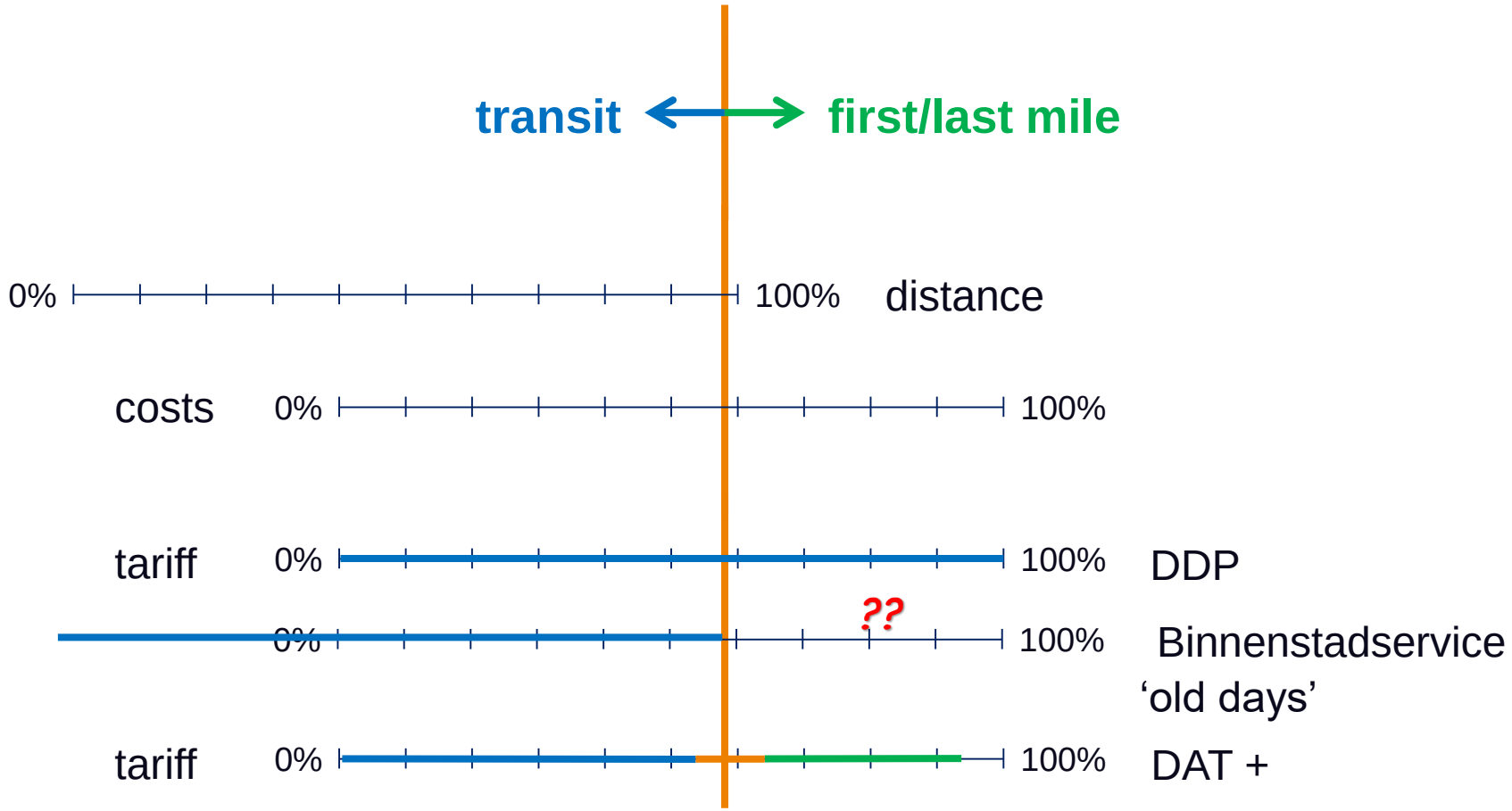
HOW TO APPLY THE EFFICIENCY OF WHOLESALE TRADE IN RETAIL?


SmartCity Hubs
risk
revenue
payment
Supplier does not reduce price
consolidation by seller
consolidation by seller
consolidation by seller
consolidatione by buyer
consolidation by buyer
consolidation by buyer
Extra cost

THE MANUFACTURER(S) HOLD THE KEY TO THE ANSWER


SmartCity Hubs
risk
revenue
payment
Price =
budget
consolidation by seller
consolidation by seller
consolidation by sellers as 'agent' of the buyers
DAT +
consolidation by seller
Efficiency
gains

Financial sustainability



What the public will deliver: City Logistics Triple P

1. Policy on sustainable logistics (SULP)

2. Procurement ; using purchase power

3. Promotion of the solution

The industry does not change by itself

- But the transport branch does not experience ‘enough’ difficulties in delivering freight at end addresses
- Public intervention is needed to safeguard the social interests like safety and liveability

Policy and law on sustainable logistics, from city to PI

If we translate our experiences in cities to the whole of the Physical internet, I would say:

- PI needs law and policy to make this transition happen in real life
- The government can support PI by new policy (carrot)
- The government can impose logistics behaviour (stick)
- The government can create new law, for instance on competition rules

Very important issues for the next IPIC conference!

More information:

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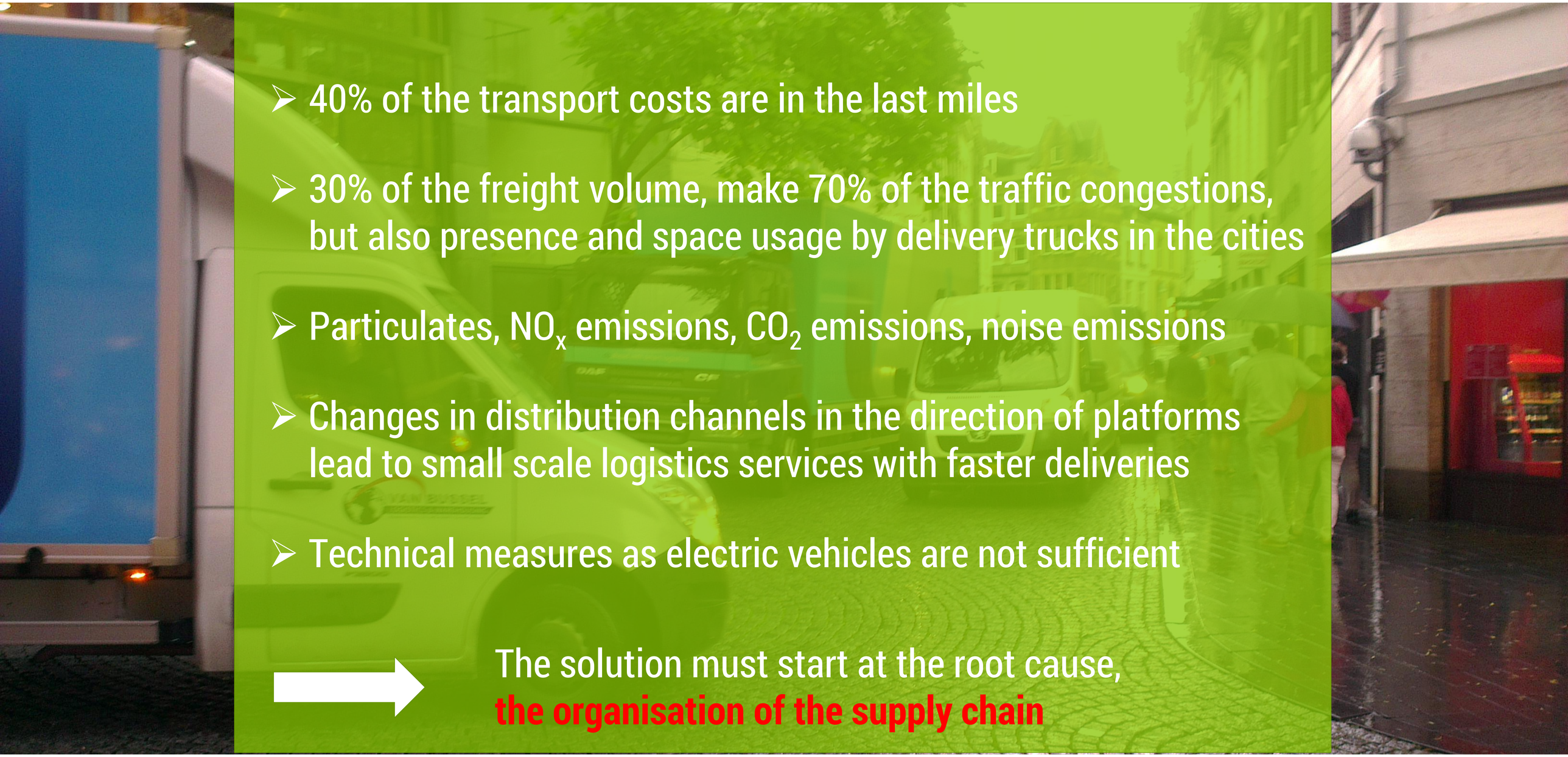
IPIC 2017

Collaborative City Logistics in hyperconnected delivery networks

Roland Frindik, MARLO Consultants GmbH, Karlsruhe, Germany
Max Prudon, Binnenstadservice Nederland B.V., Nijmegen/Maastricht, Netherlands

Why did we developed a new approach for city logistics?



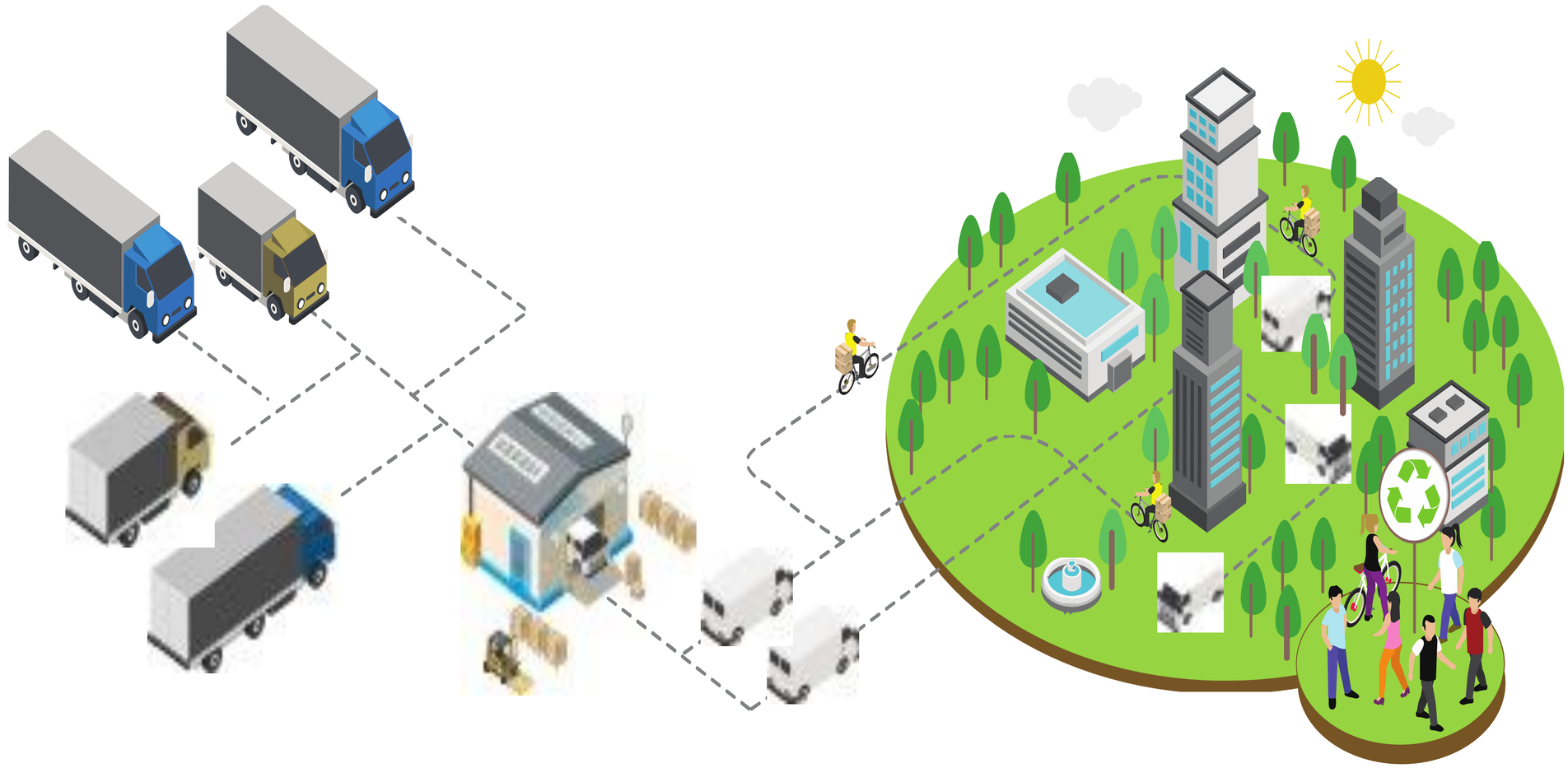
- 40% of the transport costs are in the last miles
- 30% of the freight volume, make 70% of the traffic congestions, but also presence and space usage by delivery trucks in the cities
- Particulates, NO_x emissions, CO_2 emissions, noise emissions
- Changes in distribution channels in the direction of platforms lead to small scale logistics services with faster deliveries
- Technical measures as electric vehicles are not sufficient

→ The solution must start at the root cause, **the organisation of the supply chain**

SmartCity Hubs MARLO

* CE Delft
** Kersten et al. 2017

An integrated vision
to create smart, zero emission city logistics.

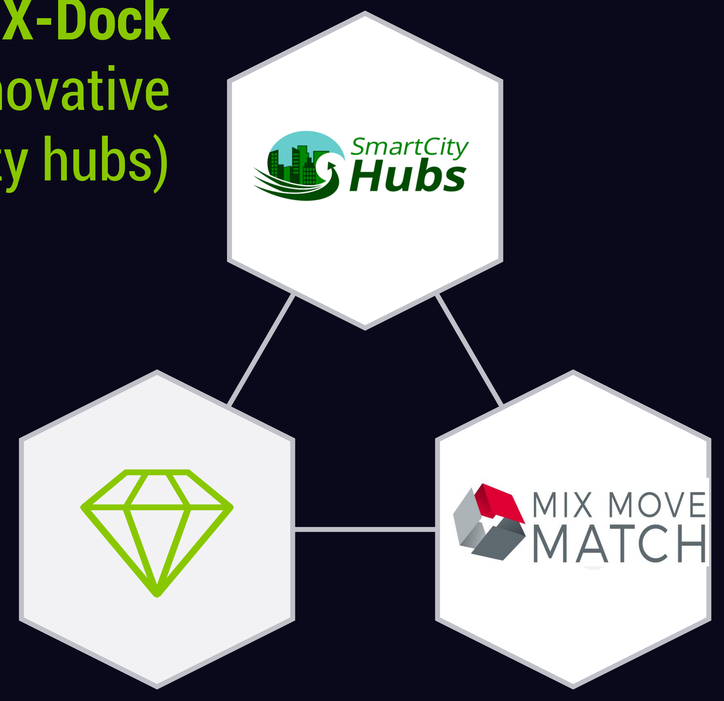


The three main pillars of the Triple X

Physical X-Dock
(an integrated network of smart, innovative city hubs: Smart City hubs)

Financial X-Dock
(an attractive financial value proposition)

Virtual IT X-Dock
(The software services to ensure seamless and integrated processes across the network supply chain: MixMoveMatch.com)



Physical X-Dock

Binnenstadservice

Binnenstadservice Hub is delivery address for all supplies

Commercial contracts with end receivers

Uniform services in distribution and VAS/VAL for shops and offices (B2B)

9 Binnenstadservice has grown to 9 Hubs in the Netherlands now

Smart City Hubs in the Netherlands today:
16 Hubs serving 22 cities

Ambition for the Netherlands:
24 Hubs serving 40 cities

Ambition for Europe:
Smart City Hubs in 500 cities connected by IT and cooperating in marketing and sales

SmartCity Hubs

MARLO

inbound

storage

outbound

reconstructed pallets

loose cartons

sorting

single cartons

> parcel service

direct reship of full pallet

Inbound scan

IT X-Dock

MixMoveMatch.com

IT X-Dock

MIX MOVE MATCH

Transform your Supply Chain

The entire concept can only work if supported on a software service that enables:

- Hub / network integration to ensure collaboration
- Seamless integration with our clients' services
- Full control and visibility over the handling and delivery process

This solution is MixMoveMatch.com

for Hubs

- Transport management
- Hub service management
- Supply chain integration
- Intelligent Cross-Docking

for Carriers

- Manage Transport Execution
- Mobility to Collect Tracking and Proof of Delivery
- Supply Chain Integration
- Customer Service
- Billing
- Sales Analysis

SmartCity Hubs

MARLO

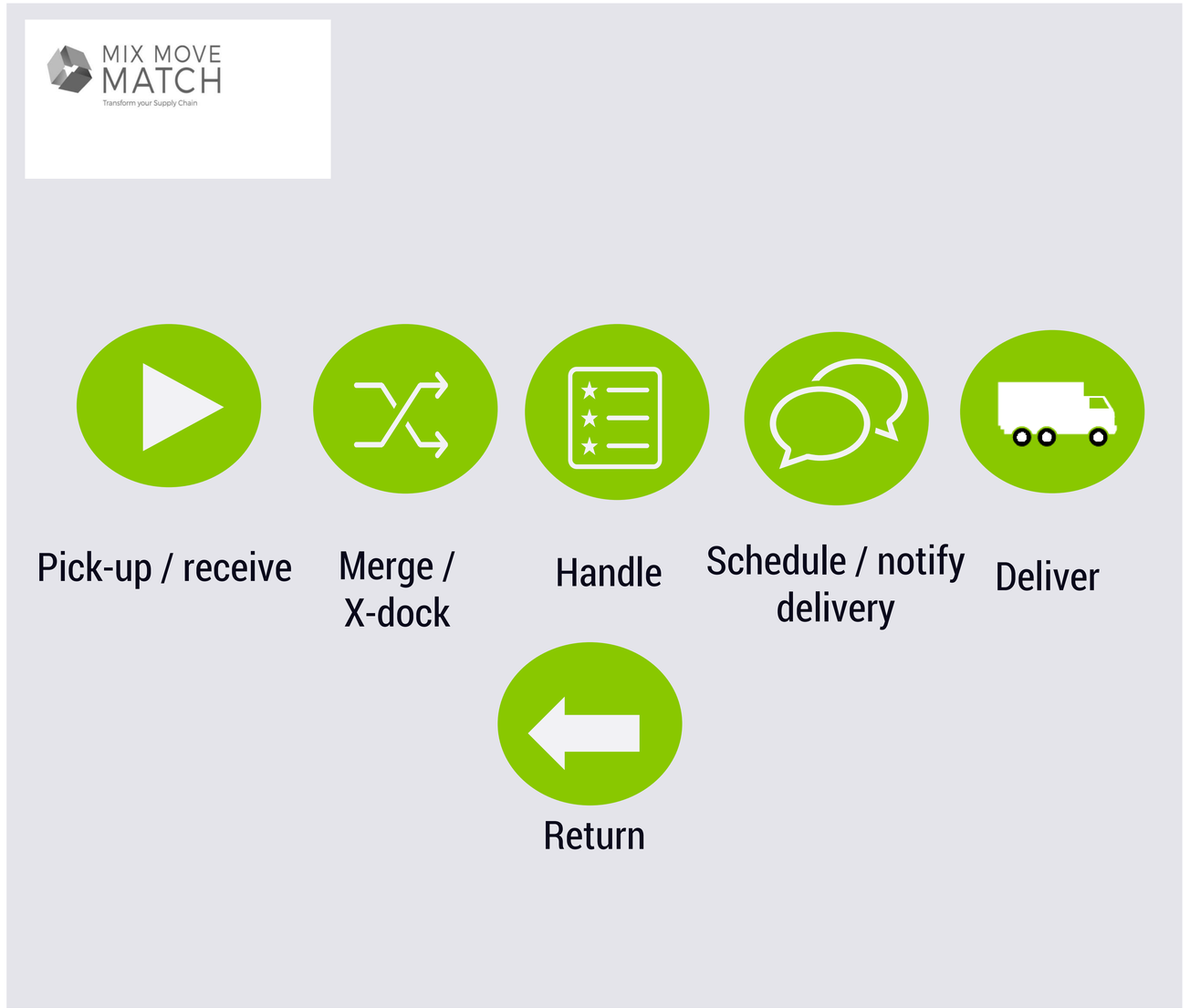
MixMoveMatch.com in a nutshell

Manufacturers

Commerce

E-commerce

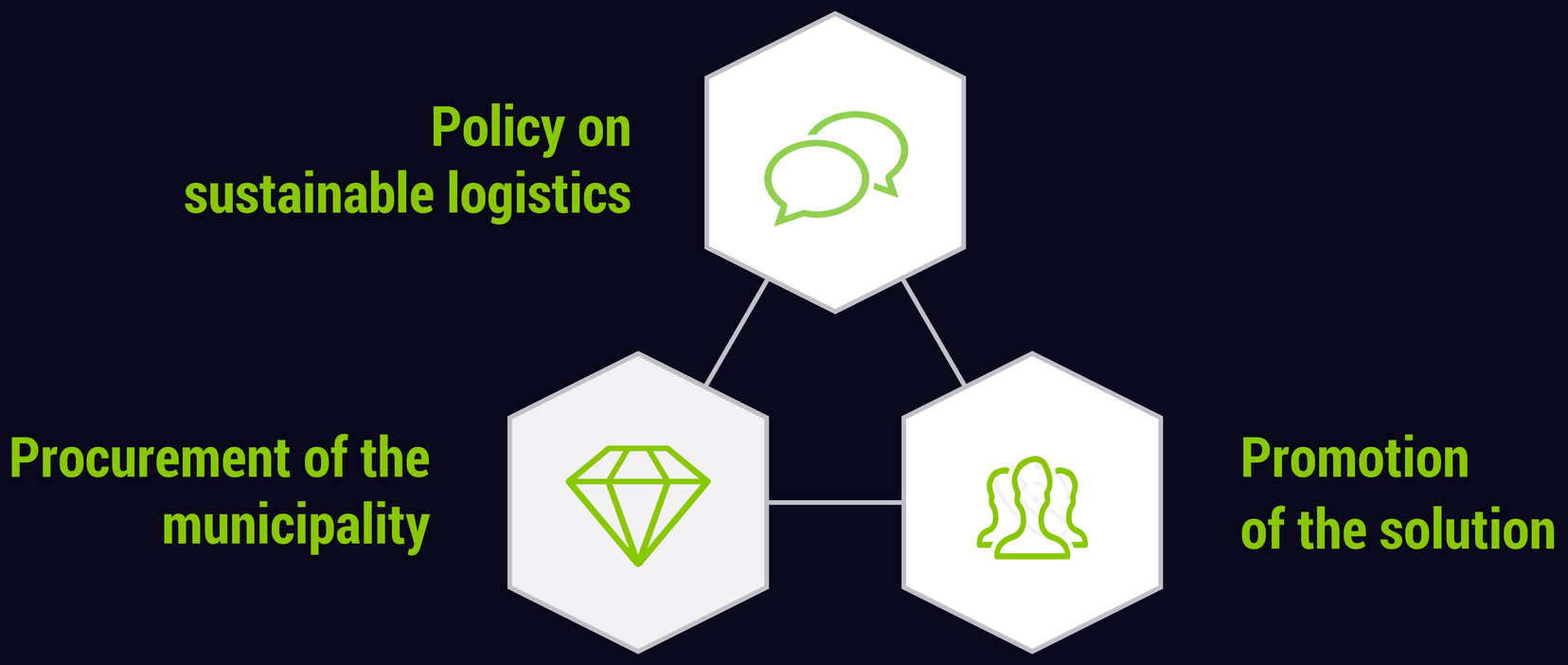
Logistic Service Providers



Stores

individuals

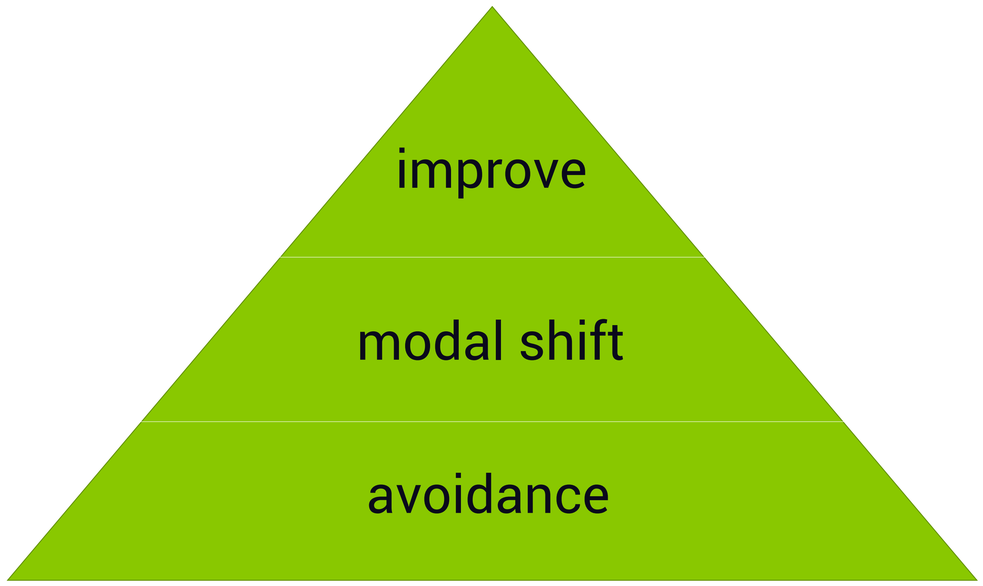
The three main pillars of the Triple P



disproportionately

Accompanying measure #1:
municipal policy on sustainable logistics

- Ambition towards **zero emission logistics** regarding noise and exhaust
- **resident friendly** unloading and loading of deliveries
  (frequency, presence and timing of delivery vans)
- reserved areas for main and micro **city logistics hubs in city planning**
- building and operational **regulations** for shopping centres (to achieve bundeling)
- special and temporal **traffic control and safety**



disproportionately
disproportionately

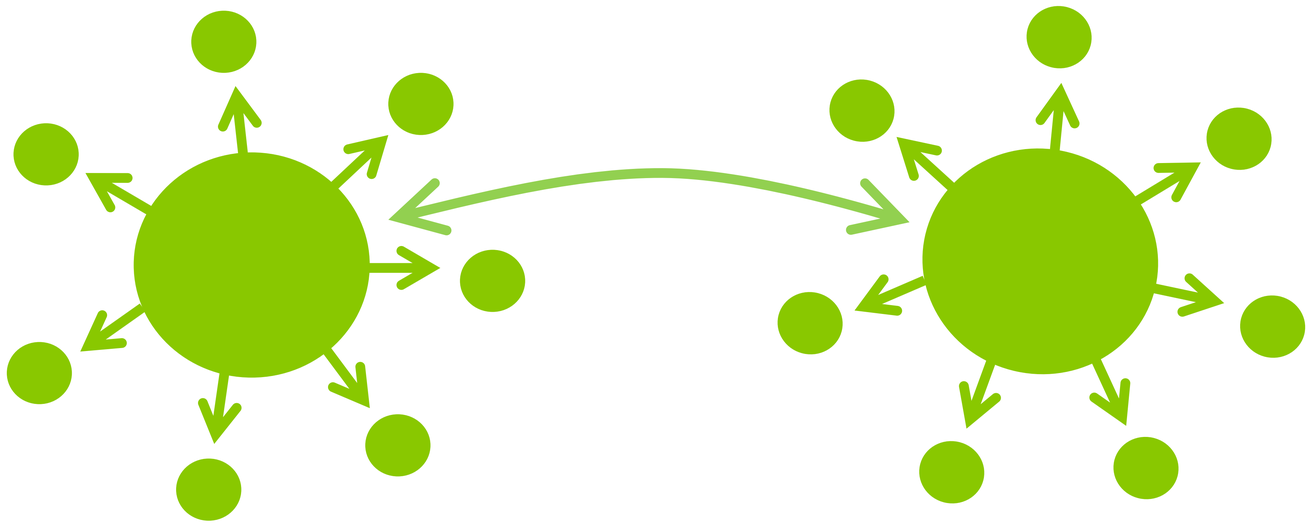
Accompanying measure #2:
municipal procurement

- Tendering for environmental **sustainable supply** of goods and services
- **Emission free and bundled delivery** to municipal offices and departments
- **Best practice** for residents and commercial undertakings

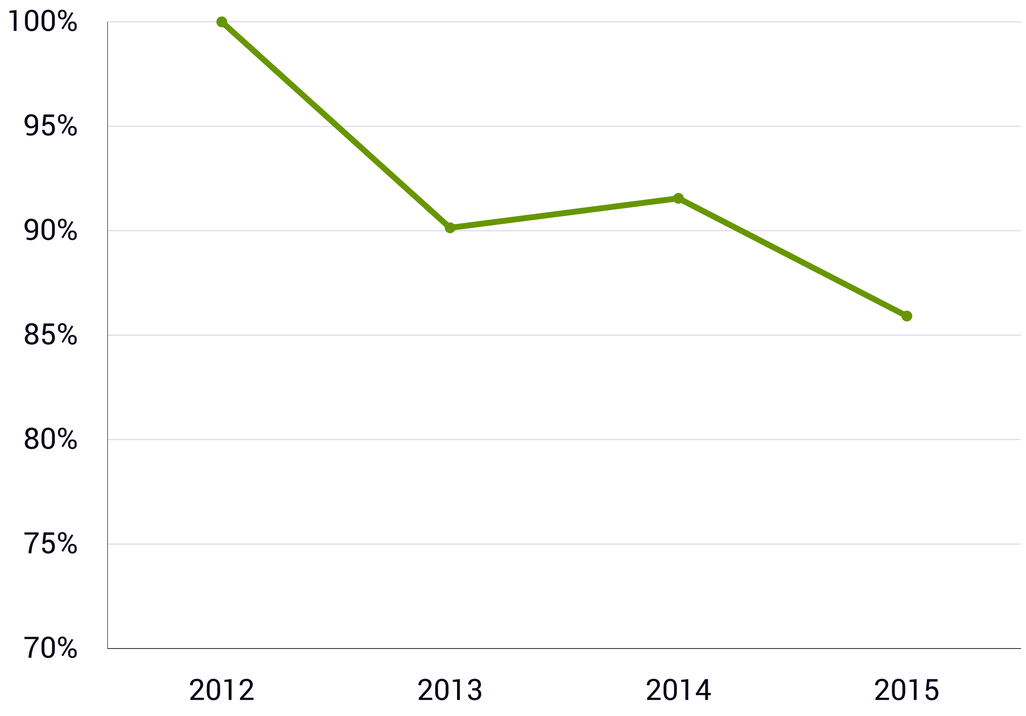
Request > **execute** > **convince**

Accompanying measure #3:
municipal promotion

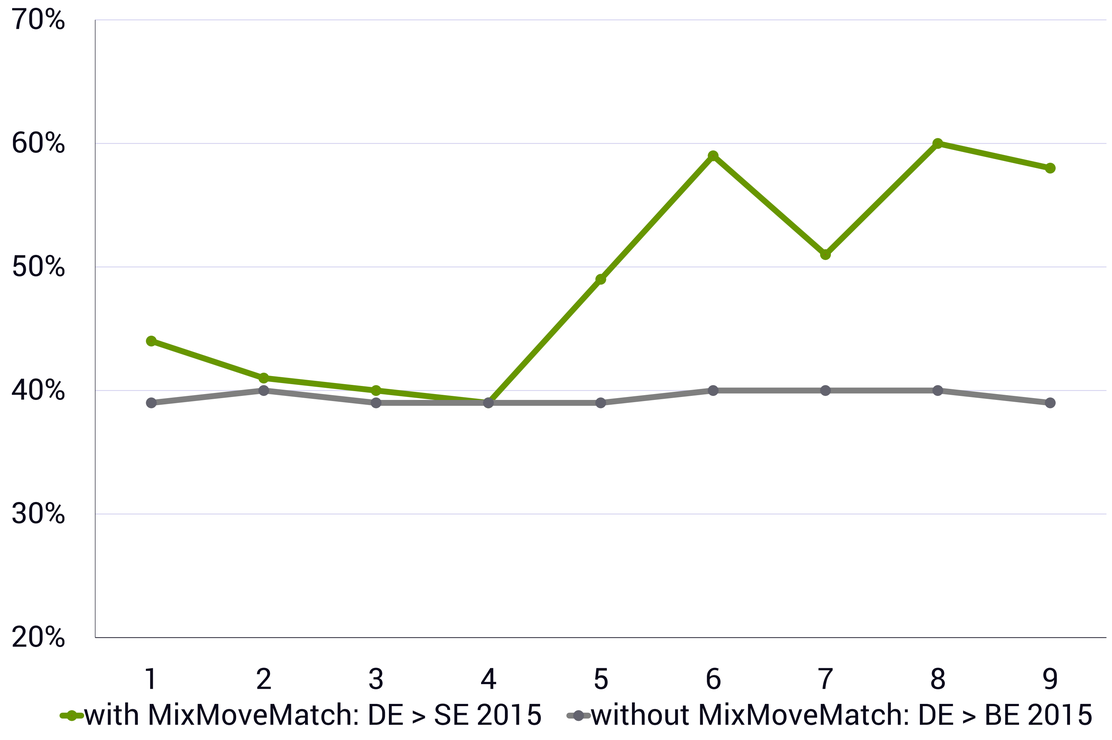
- **Actively promote** of sustainable city logistics solutions
- involvement in **city marketing** acting as multiplicator
- **networking** of local logistics community to promote cooperation
- **coordination with other cities** on national and international level
  - Cities can provide **similar service** or in the best-case act together at the market



Mix Move Match
Effects in practice of 3M



Freight costs evolution during the use of MixMoveMatch.com (index 100%=2012)

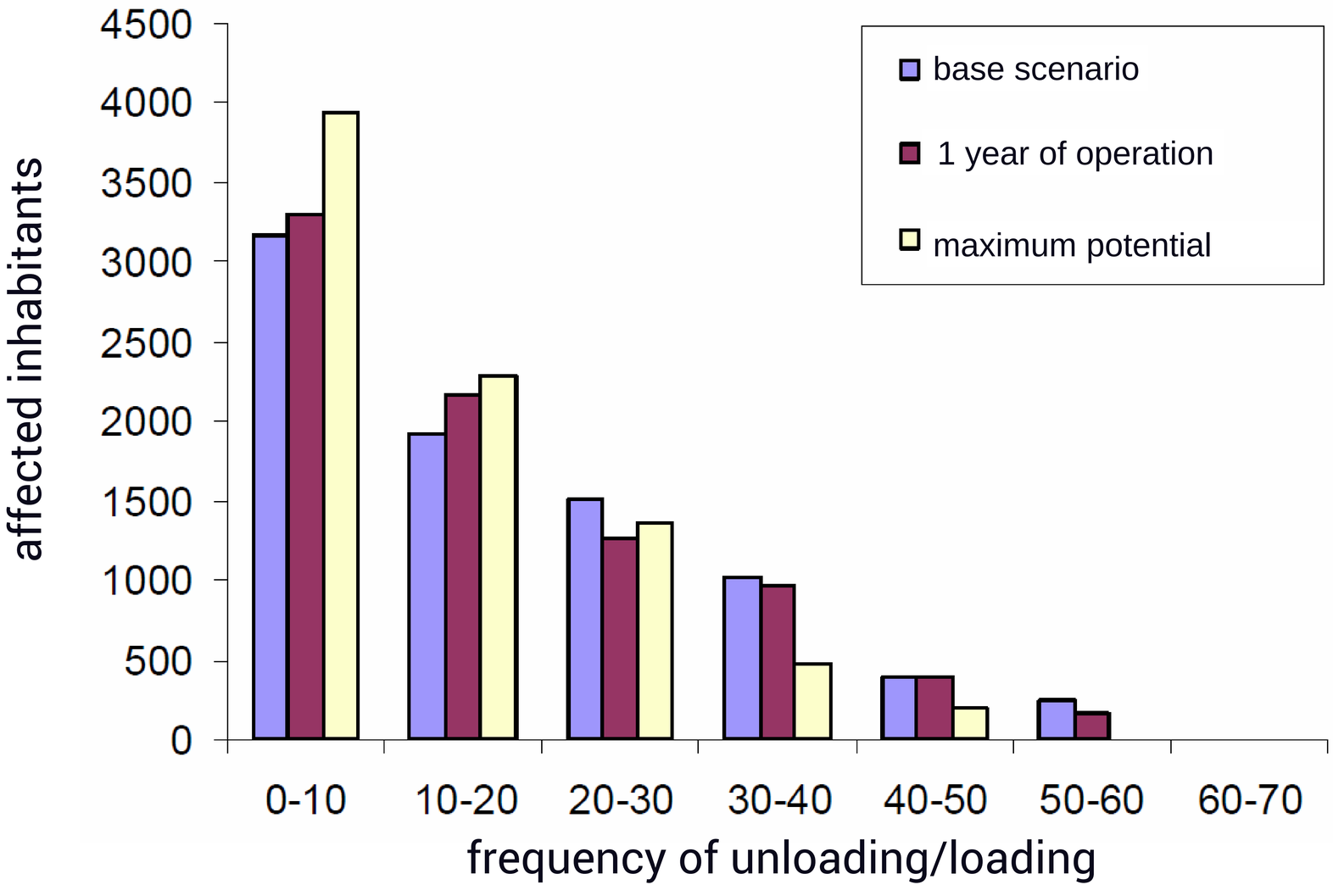


Load factor with and without use of MixMoveMatch.com during 9 months in 2015

Effects in practice – city logistics Nijmegen*

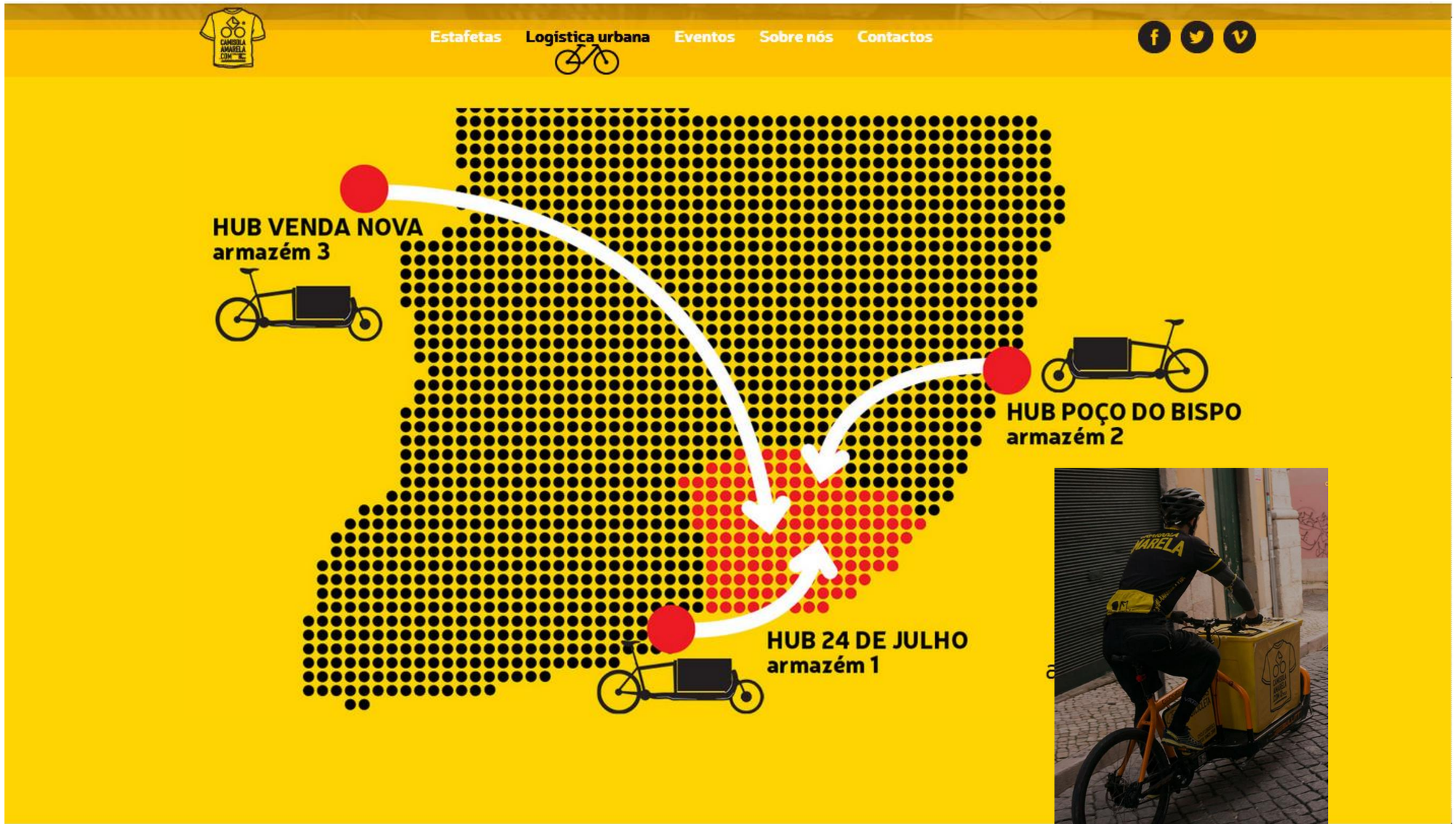
Effects after one year in the city center:
> 5% less truck-km
> 7% shorter length of stay of the truck

Potential in the city center:
> 32% less truck-km
> 25% shorter length of stay of the truck



*L. van Rooijen:
local impacts of a new urban consolidation

cargo bicycle city logistics
best practice case Lisbon

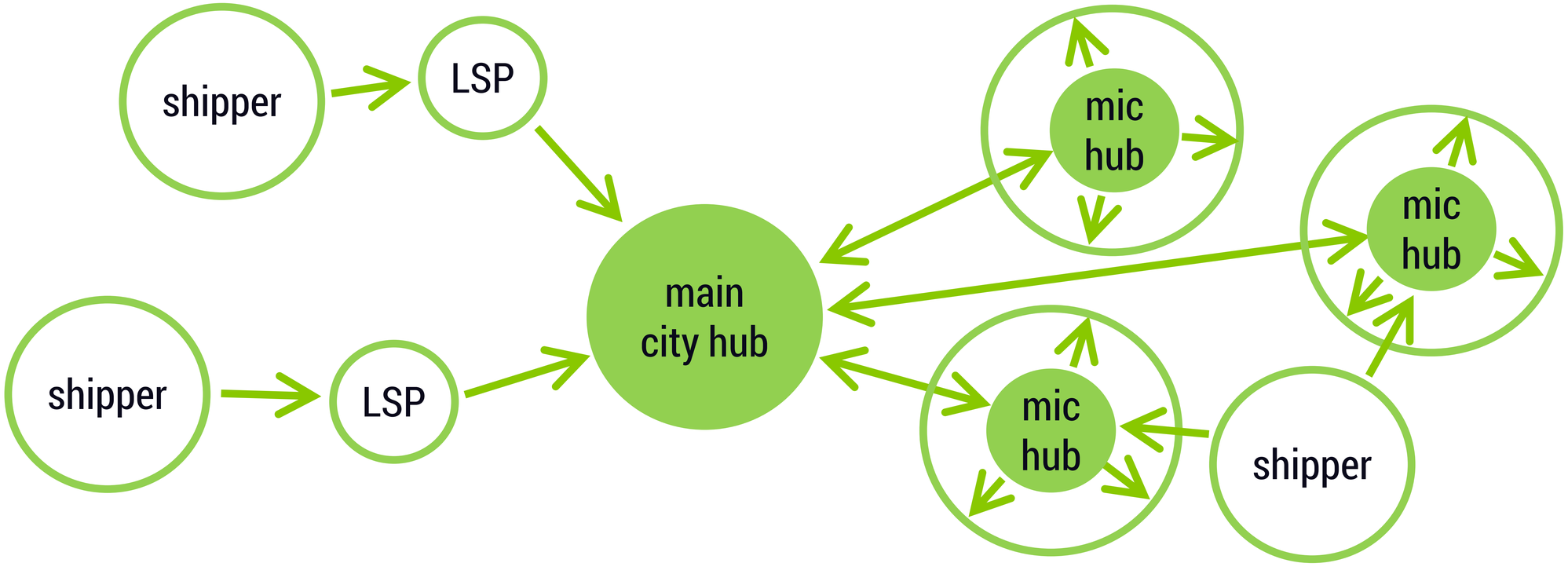


operator: Camisola Amarela

disproportionately
disproportionately

benefits for city logistics

- free choice of logistics service providers
- reduce delivery tours within the city
- continuous visibility of the supply chain in all cities
- applicable even for smallest volumes for delivery to retailers and customers (B2C, B2B)
- enable shippers to postpone their load close to their receivers



mic hub: micro consolidation hub
LSP: logistics service provider

disproportionately
disproportionately

Future –
long-term vision

- implement a **network of smart city hubs** all over Europe
- **Trigger city governments** to establish the supportive policy based on Triple P
- City logistics hub will act together with **one face to the customers**
- incentives from the **sharing economy**: transport or warehouse space, VAS
- **IT-solutions are the enabler** to be able to manage such complex and fast acting processes

- Most important:

  Willingness of all stakeholders, both industry and government, to cooperate and coordinate.

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http://www.goederenhubs.nl

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ALICE, a European Technology Platform inspiring collaborative logistics for a competitive and sustainable industry

Paola Cossu – CEO of FIT
ALICE WG5 urban logistics

IPIC conference 2017
Graz 5th July 2017

European Commission

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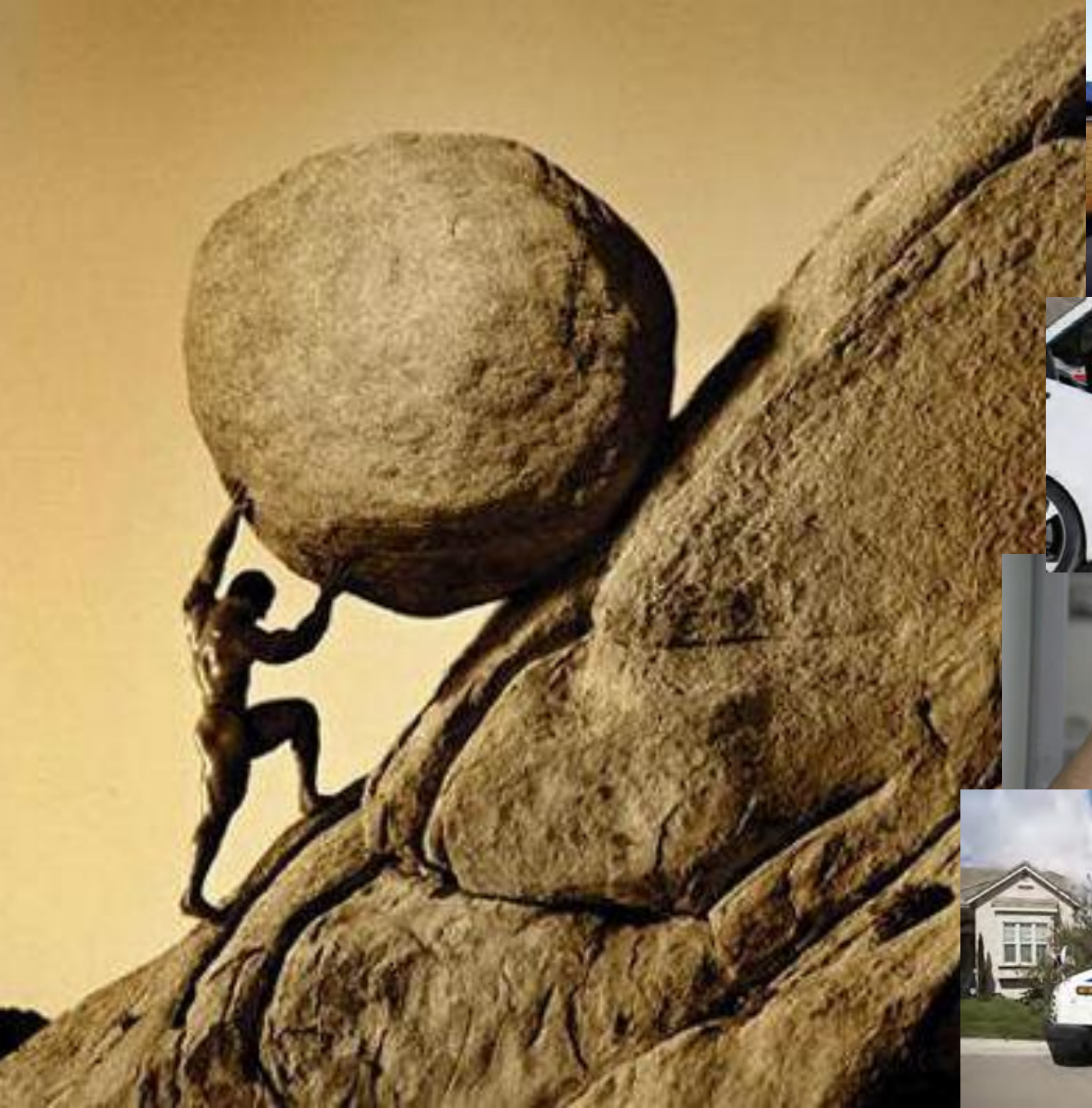
Are they happy with that?

European Commission




OTTO


amazon.com

"I want to fill the empty space!"

(Alain Baeyens - Director Logistics / Solvay)

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- Current research evidences that translating the working principles of the Digital Internet into the routing of freight, has huge potentials to be the **real game-changer**.
- Physical Internet is hub-to-hub freight movements throughout an open network rather than directly moving from origin to destination.
- Parcels will be moving in an automatic way and each part of the network is working in efficiency.

➡ **Urban logistics is an innovation key driver as support to the last mile efficiency**

European Commission

In Europe, urban logistics represents the 28% of the total transport costs and contributes in producing from 16 to 50% of total traffic air pollution.
Recently, new trends are emerging in urban logistics (e.g. e-commerce, sharing economy, autonomous vehicles).
Collaborative transportation systems have become an increasingly popular practice due to the crisis.
However, the concept of **cooperation and competition** and data-sharing still requires further development and research.

From INDIVIDUAL INITIATIVES

To framework for a more consistent approach of urban logistics issues throughout PI.

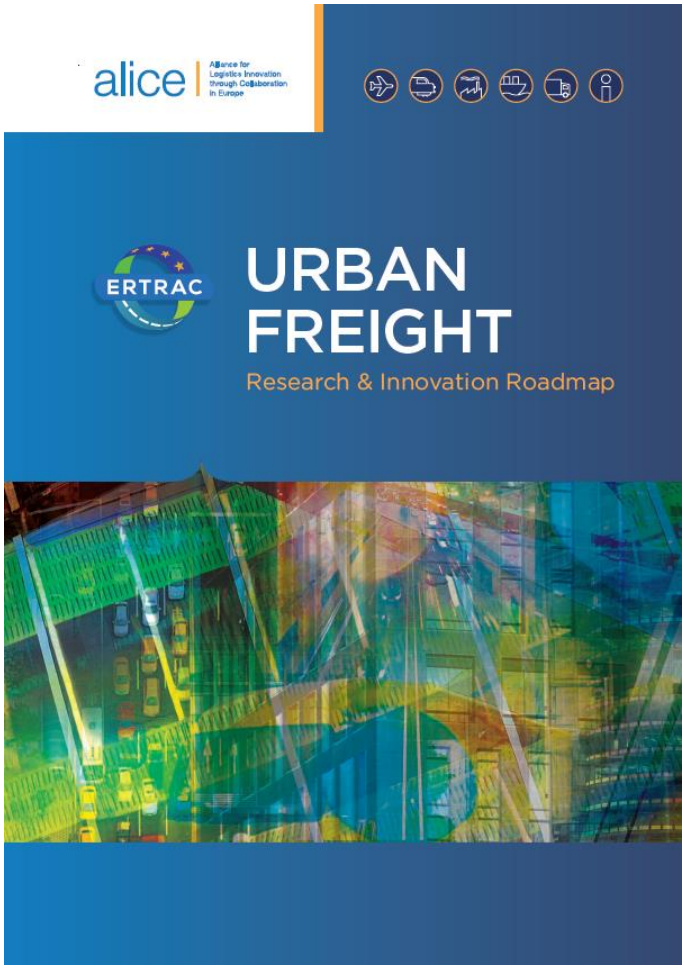
ALICE Working group 5 – Urban Logistics

The Urban Freight Research Roadmap

This document is a **Research Roadmap** on urban freight and logistics delivered jointly by **ERTRAC**, the European Road Transport Research Advisory Council, and **ALICE**, Alliance for Logistics Innovation through Collaboration in Europe.

The **goal** of the roadmap is to identify research priorities related to urban freight, returns and urban logistics and to contribute to the definition of research programs for the actors of the sector, including Horizon 2020, the European Programme for Research and Innovation.

It was developed in 2014 and updated in 2016.



Scope of the Urban freight Roadmap

The scope of the roadmap is urban freight transport, defined as all movements of goods into, out of, through or within the urban area, made by light or heavy vehicles, including:

- Delivery of goods (business and home).
- Service transport and demolition traffic.
- Shopping trips made by private households.
- Reverse logistics for waste removal and for returns management.
- Service vans for maintenance, supply and removal of parts.

Motivation behind the Urban freight Roadmap

The following issues were taken into account:

- Concentration of population in cities (72% EU population - live in cities, towns and suburbs, 80% in 2020).
- Urban freight as an important traffic component in cities (10 to 15% of vehicle equivalent miles).
- Very low load factors for delivery vehicles in cities (e.g. 38% for vans in London).
- Urban freight being responsible for 25% of urban transport related CO2 emissions and 30 to 50% of other transport related pollutants (Particulate matter, Nitrogen Oxide).
- Urban freight service companies generally being very small (85% of short distance truck companies have less than five employees).
- Urban freight accounting for a significant part of ambient noise.
- Changing urban freight patterns due to teleworking, ageing population, more densely populated urban areas, growth of e-Commerce.
- European Policy for zero CO2 emissions in cities by 2030

Challenges, themes and topics

- Identifying and assessing opportunities in urban freight
- Towards a more efficient integration and management of urban freight in the transport system of the city
- Business Models and Innovative Services.
- Safety and security in urban freight.
- Cleaner and more efficient vehicles.

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Vision and research areas

The ALICE working environment builds upon different research areas and the working group urban logistics vision is to achieve a full integration of freight flows in cities' operations and activities that allow citizens to access the goods they require, supporting sustainable and efficient development.

Research areas have the following targets:

- Increase **energy efficiency**, which can be achieved by improving the efficiency of the whole urban logistics system added to the expected gains in the energy efficiency of vehicles.
- **Improve the urban environment** by increasing air quality and reducing noise.
- **Increase customer satisfaction** by delivering the goods on time and improving the reliability of the system.
- **Increase safety and security** reducing injuries and fatalities and also cargo lost or damage.

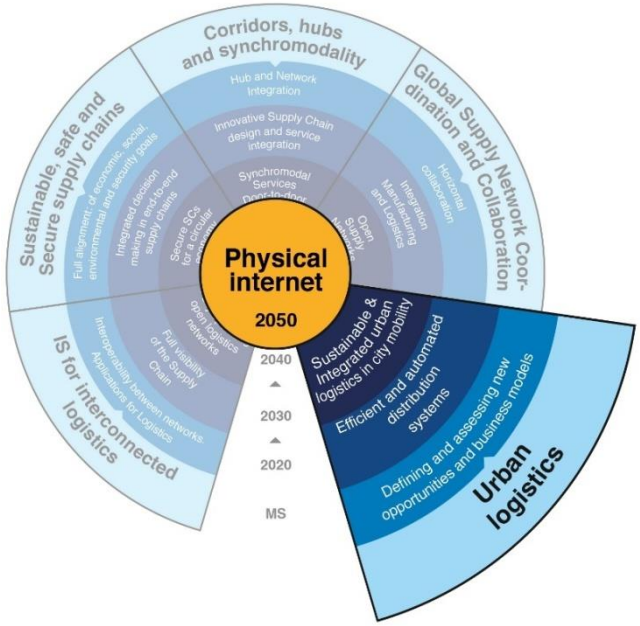
Urban logistics: Milestones to PI

2020 Defining and assessing new opportunities and Business Models

2030 Efficient and automated distribution systems

2040 Fully integrated urban logistics in the city mobility system

2050 Physical Internet (2050)



NEW FOCUSED AND STAKEHOLDER ORIENTED IMPLEMENTATION PLAN WITH NEW RESEARCH TOPICS - IMPLEMENTATION PLAN

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Research period 2018-2020:

As result of benchmarking and dense bottom up consultation with stakeholders, research topics to be activated as “Call for Innovation” and are presented:

- **Logistics in the full circular economy: New business models for horizontal and vertical collaboration**
- **Integrated data framework and Big Data analytics assisting decision-making in urban freight transport**
- **Exploring new opportunities for achieving effective integration of urban freight and personal mobility services and networks**
- **Improving the link between urban and long distance freight transport services and infrastructures**
- **New business models for logistics services based on sharing economy**
- **Bringing Logistics into urban planning**
- **Interoperable standard modular loading units’ operation in the urban context: autonomous deliveries**
- **Safety and security in urban freight**

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Implementation Plan – proposal of topics

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Logistics in the full circular economy: New business models for horizontal and vertical collaboration

Challenge:

- Integrate supply networks, including the reverse part of the chains, to make full utilization of resources within and across supply chains

Outcome:

- New (business) models that increase the global efficiency of supply chains
- Demonstrators of design of hub operations, transport, packaging systems and handling technologies
- Overcome regulation barriers and definition of incentive schemes

Impact & targets:

- Energy efficiency gains
- Reduction of env. impact
- Reduction of logistics costs thanks to opportunities of synergic flows
- Increase asset availability and quality
- Increasing customer and market acceptance

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Implementation Plan – proposal of topics

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Integrated data framework and Big Data analytics assisting decision-making in urban freight transport

Challenge:

- Big data analytics will offer greater opportunities to link freight operator's decision making with city planners decision making

Outcome:

- Structured knowledge base on current applications of Big Data in urban freight transport
- Business cases, achieving positive impacts on energy use, environment and resilience of cities
- Roadmap of research to mitigate gaps between private & public decision-making

Impact & targets:

- Better use of predictive analysis to achieve economies of scale in accessing data
- Resilient use of city transport network
- Faster development of big data program and regulation frameworks in public sector

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Implementation Plan – proposal of topics

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Exploring new opportunities for achieving effective integration of urban freight and personal mobility services and networks

Challenge:

- Further exploitation of the potential of integration between urban freight and passengers transport networks
- Freight/passenger integrated mobility planning

Outcome:

- Tools, methods and data sources to identify opportunities of flows integration and support the development of integrated mobility plans
- New concepts and technologies contributing to a better integration of freight and passenger flows
- Development of business models offering mobility as a service (MaaS)
- New concepts and technologies for a better integration of flows

Impact & targets:

- Increased use of assets and infrastructures
- Reduction of congestion and CO2 through use of public transport network for freight

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Implementation Plan – proposal of topics

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Improving the link between urban and long distance freight transport services and infrastructures

Challenge:

- Reduce freight transport movements, congestion and to increase the load factor in urban areas through optimization of the links between urban and long distance transport

Outcome:

- Tools for urban planners to decide on optimal location and size of connected urban hubs and transport means
- Evaluate different business and governance models
- Pilot solutions for optimising the use of UCC and micro platforms exploiting horizontal and vertical collaboration

Impact & targets:

- Increased use of assets and infrastructures
- Reduction of congestion and CO2 through optimization of traffic between hubs and urban areas, improvement of load factor and use of green vehicles

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Implementation Plan – proposal of topics

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New business models for logistics services based on sharing economy

Challenge:

- Find new approaches to find unexplored potentials or emerging peer-to-peer (P2P) business / business – to – consumers (B2C) opportunities in freight market

Outcome:

- Truly innovative, sustainable and long lasting forms of cooperation, business and social models for urban logistics services
- New governance models and related marketplace rules
- Business-led roadmaps ensuring a seamless and significant market take up and roll out of collaborative meta-business models

Impact & targets:

- Increased load factors
- Operational cost reduction
- Reduction of lead-time
- Better infrastructures capacity use

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Implementation Plan – proposal of topics

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Bringing Logistics into urban planning

Challenge:

- Define conditions towards proper consideration of urban logistics infrastructure needs and urban design aspects in Sustainable Urban Logistics Plans integrated in overall mobility plans

Outcome:

- Recommendations on architectural design and integration of logistic facilities in urban areas
- Analytical economic models to support stakeholder analysis
- Large-scale demonstrators on logistics planning for urban city planners

Impact & targets:

- Increased use of assets and infrastructures
- Reduction of congestion and CO2 through optimization of traffic and better vehicle utilisation

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Implementation Plan – proposal of topics

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Interoperable standard modular loading units' operation in the urban context: autonomous deliveries

Challenge:

- Modular urban loading need to be designed and tested for different urban scenarios and demonstrate the full advantages
- Pave the way towards a global standardisation to realize full benefits.

Outcome:

- Development of modular urban load unit compatible with regular containers and vehicles
- Development of technologies to transfer standard loads between vehicles
- Large scale pilot project

Impact & targets:

- Improvement of load factors and vehicle utilization
- Reduction of CO2 emission thanks to traffic reduction
- Reduction of handling costs and time in last mile operations Increase safety and security of cargo

European Commission

Implementation Plan – proposal of topics

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Safety and security in urban freight

Challenge:

- Solutions to guarantee a safe urban delivery system minimizing the risk for freight operators and ensuring peoples' privacy and security at the same time

Outcome:

- Efficient, reliable and safe solutions enabling the decoupling of the delivery and the collection of the goods
- Solutions to improve security and safety by assessing the potentials of improvements of human machine interfaces, policies, vehicles and information and ICT

Impact & targets:

- Increased customer satisfaction
- Reductions of failed deliveries
- Reduction of cargo loss due to theft or damage
- Improvement of resilience and robustness of urban freight systems

European Commission

ALICE WG5 tasks

- **Milestones achieved**:
  - UF Roadmap first release: **November 2014**
  - Recommendations for Urban Mobility topics H2020 2016-2016: **January 2015**
  - **SETRIS project funded** Strengthening European Transport Research and Innovation Strategies (funds from the EU Horizon 2020). Started in 2015
- **Activities during 2015-2016-2017 requiring contributions from Urban Logistics working group:**
  - **Follow up past & current projects** and best practices
  - **Deeper analysis** of what changes the Roadmaps shall imply, of **barriers** affecting the **change industry take up**.
  - Further analysis on **expected impacts and related indicators** and ways to measurement progress.
  - Further develop **implementation plans** for the Roadmaps (with new challenges)
  - Joint Roadmaps from new research needs and challenges (with all ETPs in SeTRIS)
  - Collaboration meeting with stakeholders in Brussels (May 2017) for sharing projects outcomes and catch up new prospects for urban logistics in research and new challenges

Urban logistics (WG5)

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