DANUBE REGION strategy
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THE DANUBE REGION TRANSPORT DAYS 2022:
"Towards energy efficient, sustainable transport"

City logistics: first and last mile solutions for enhanced energy efficiency

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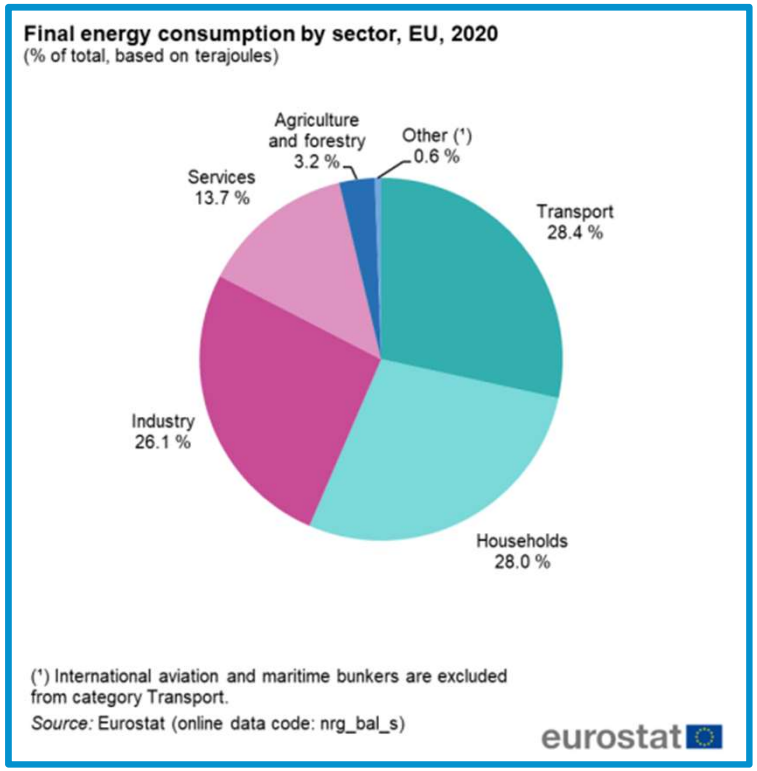
Transport -> Energy -> Emissions

- **Transport sector in the EU**:
  - consumes **28% of the final energy** and
  - produces **25% of total CO2 emissions**.

- **Road transport:**
  - the **largest consumer and emitter** among all transport modes,
  - it consumes **83% share of transport energy** and
  - produce **93% of CO2** emissions.



Transport -> Energy -> Emissions

- **The biggest share** of energy consumption and production of transport emissions is **related to cities**.
- **Passenger cars** are responsible for **more than half** of the total transport energy consumption and CO2 emissions in European cities.
- **Freight vehicles** contribute to about **19%** of **energy use** and **21% of CO2 emissions**.

Cities occupy just **3 percent** of the Earth's land but account for **60 to 80 percent of energy consumption** and at least 70 percent of carbon emissions.

Empirical studies reveal that freight vehicles today produce already **10–15%** of total urban vehicle-kilometres

Last mile delivery (inefficiency)

- The term **“last mile”** is the **last leg of the logistics process**. Movement of parcel (product) from a transportation hub to the final destination.

- This is called a **“last-mile problem”** and it arises because of the **difficulty of reaching end users**, especially in busy **urban areas** (congestion and safety concerns).

https://www.mitchellsny.com/blog/overcoming-last-mile-logistics-challenges/

Last mile delivery (inefficiency)

- **Growth of e-commerce** (large proportion return to sender – 70%)
- **Increasing number** (growth) **of small packages** (pull logistics principles)
- Same day, JIT and **instant delivery** (new standards, especially for food)
- **Low utilisation** rate of freight vehicles (20% empty trips, load factor only at 0,3)
- **Not adequate logistics facilities** in cities (transhipment points, loading bays …)
- **Big share of own delivery** (far from optimal, small quantities)
- **Increase** of urban **freight traffic** – 3% per year

Policy goals (2030/2050)

- **EU transport policy goal:**
  - EU first climate-neutral continent by 2050
  - **90% reduction in transport-related greenhouse gas emissions by 2050**
  - reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels

Essentially CO2-free city logistics in urban centres by 2030 (White paper / 2011)

Solutions

Energy efficiency is **the use of less energy to perform the same task or produce the same result**.

Aim of city logistics (Taniguchi, 2001):

- *„Optimise logistics system within an urban area by considering costs and benefits of schemes to the public as well as the private sector. Private shippers and freight carriers aim to reduce their freight costs while public sector tries to alleviate traffic congestion and environment problems.“*

Solutions (policy measures)

- **Anti-idling and eco-driving** (training for energy efficient driving), **certification programmes** (labelling – fleet operators)
- **Incentives and subsidies** (electric vehicles promotion, reduction of tax, funding schemes).
- **Time access restrictions** (daytime delivery bans, silent night-time deliveries), **parking regulations** (vehicle parking reservation systems, delivery space booking system, timeshare of parking space, peak-hour clearways.
- **Location of logistics facilities** (on street - kerbside and off-street loading bays), integration of logistics plans into land use planning concepts, urban consolidation centres (UCC).

Solutions (policy measures)

- **Investment in electric charging stations** and investment in logistics facilities (loading bays, urban consolidation centres, freight lockers).
- **Consolidation schemes** (managing urban consolidation centres), **new business models** (collaboration)
- **New vehicle technologies** (electric/hybrid engines and batteries, new vehicle concepts), dynamic vehicle routing (freight routing optimisation) and ITS information systems
- **Etc.**

Solutions (best practices)

FREIGHT BIKES

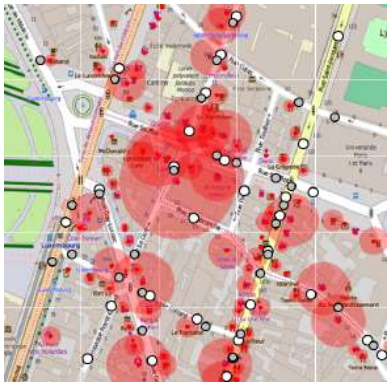
In **Turin**, it was estimated that:

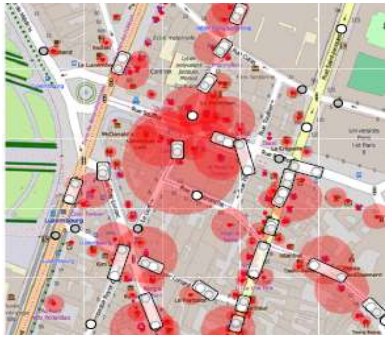
- CO2 emissions of **250 grams per kilometer** could be reduced by using a freight bicycle.

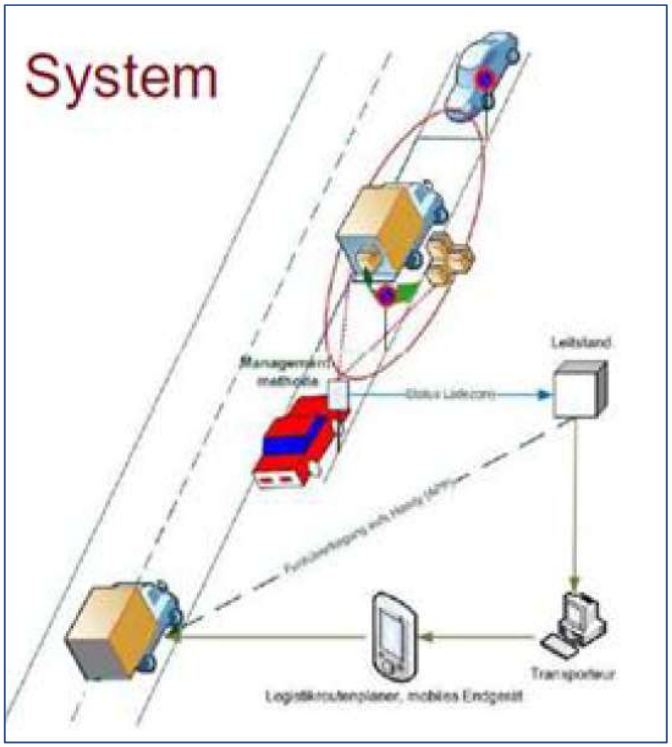
In a pilot project in **London**, the introduction of freight bicycles:

- reduced the total distance travelled by **14%** and CO2 emissions per consignment by **55%**.

Solutions (best practices)







MANAGEMENT OF LOADING BAYS

In **Rome**, a computer simulation was carried out in which dynamic management and reservation of loading bays were envisaged.

They found that such a concept could reduce:

- **total delivery** time by **66%**.
- similar results achieved in **Paris** and **Vienna**.

Solutions (best practices)

MOBILE DEPOT

TNT introduced this measure in **Brussels** and achieved good results in reducing emissions.

In the pilot project, they achieved:

- **24% reduction in CO2** emissions
- **22% reduction in PM10** particles
- similar results are achieved also in **Turin** (Italy)

Solutions (best practices)

DELIVEERY ROUTE OPTIMISATION

In **Vienna**, they have developed an intelligent system to optimize vehicle driving around the city.

The pilot project achieved

- **60% savings** in **time**,
- **15% savings** in **mileage**,
- **20% savings** in **fuel** and **emissions**, and
- **30% reduction** in delivery costs to the city center.

Solutions (best practices)

OFF HOUR DELIVERIES

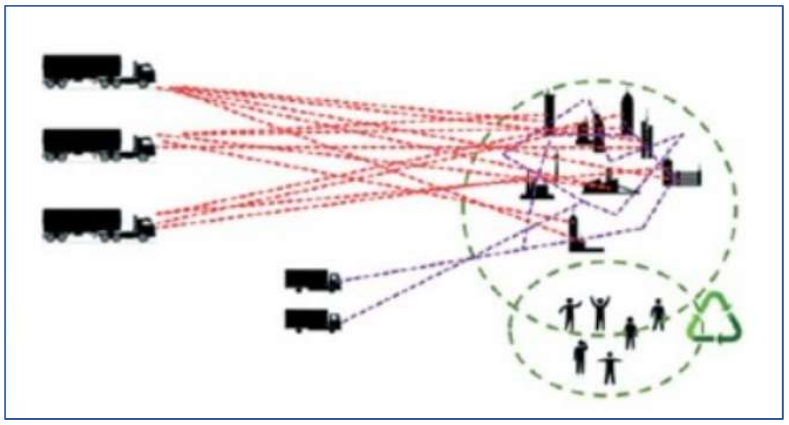
The city of **Barcelona** implemented a project to promote night deliveries to major stores in the city:

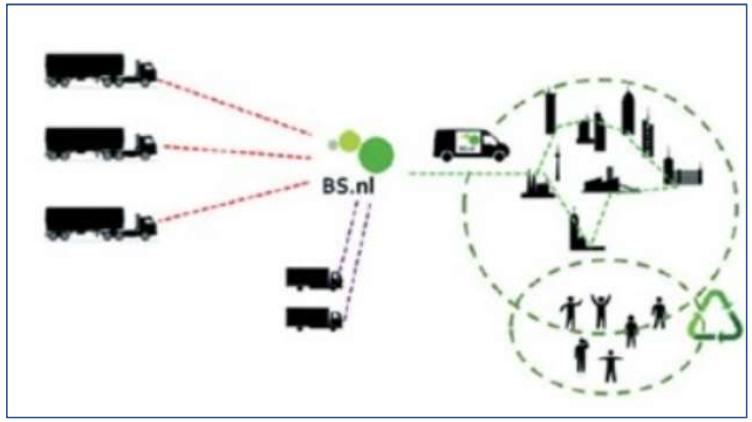
- vehicles equipped with **PIEK** noise reduction **technology** (silent hydraulic system and low-noise tires).

During the pilot they managed to:

- reduce **delivery times by 50%**,
- fuel consumption by **57%** and
- emissions by **53%.**

Solutions (best practices)





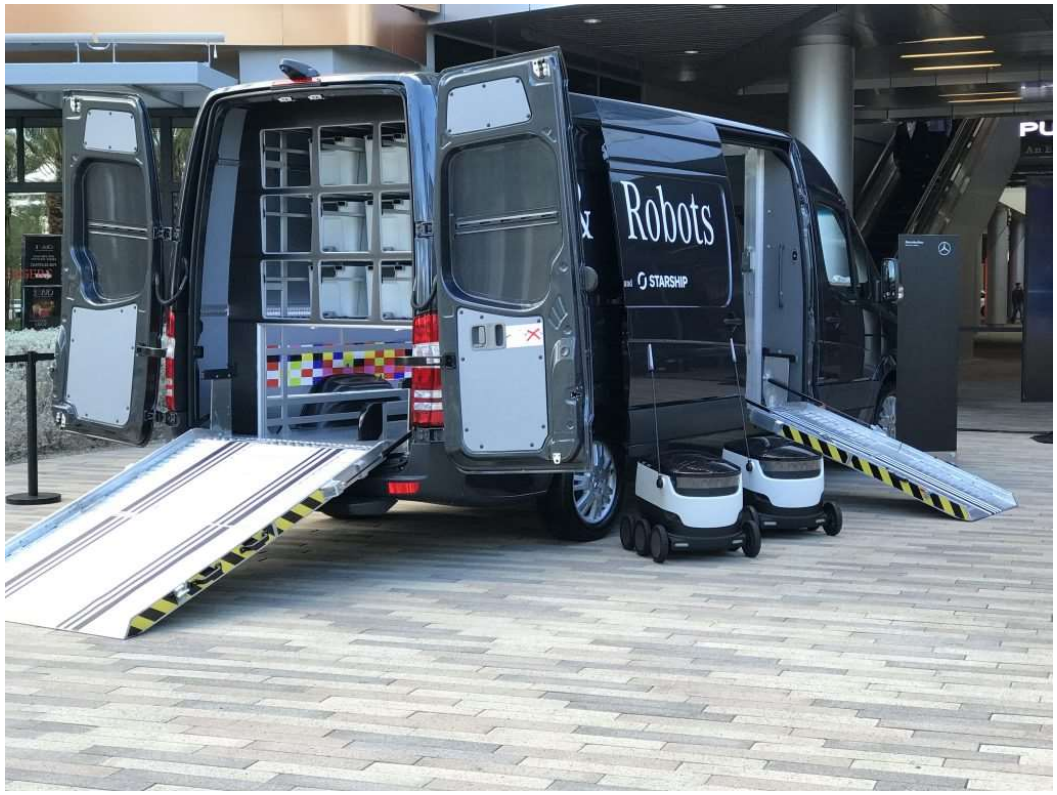
URBAN CONSOLIDATION CENTRES (UCC)

London - a city consolidation center was introduced, which was available for the needs of construction logistics in the city.

The following benefits have been identified:

- **70-80% reduction in energy consumption** (and consequently CO2 emissions)
- **70% reduction** in the **number of vehicles** delivering to the construction site.

Solutions (best practices)



ROBOTIC AUTONOMOUS DELIVERY

Trials in California and Washington D.C.

The first results show that with a small fleet of robotic vehicles:

- the cost of the last mile can be reduced by up to **40%.**

Solutions (best practices)

- **Crowd sourcing** (wan sharing)
- **Delivery lockers**
- **Dron delivery**
- **Delivery to the trunk of a car**
- **Shared distribution centres** among logistics operators

Manny innovative (mainly technology driven) approaches.

Conclusions

- **Transport sector** is the **largest consumer** of final energy in EU (**28%**)
- The biggest share of **energy consumption** is related to **cities** (**60-80%**)
- **Freight vehicles** contribute to about **19%** **of energy use** in cities
- **Last mile** is the most **inefficient** part of the supply chain - **28%** of the total transportation costs

Conclusions

- Urban **freight traffic** is **increasing** (new logistics trends) by **3%** per year
- **Policy goals** - **90%** reduction in transport-related greenhouse gas emissions by **2050** and **CO2-free** city logistics in urban centres by **2030**
- **Policies, measures and best practices** are **creating potentials** (especially with development of technological solutions) – **up to 80%** reduction of energy consumption

Thank you very much.

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