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#### City Logistics in Sustainable Planning

#### **Prof. Seraphim KAPROS**

Department of Shipping, Trade and Transport University of the Aegean



#### **City Logistics in Sustainable Planning**

## From Urban Goods Movement to City Logistics...



## Urban freight: the "hidden" face of transport system

A city generates about:

> 0.1 delivery or pick-up per person per day

> 1 delivery or pick-up per job per week

> 300 to 400 truck trips per 1000 people per day, and

> 30 to 50 tons of goods per person per year.



## **Urban freight**

□ Urban freight represents:

- >10% to 15% of vehicle-km travelled in city streets
- > 2% to 5% of the employed urban workforce.

#### □ The "real estate" of Logistics:

> 3% to 5% of urban land is devoted to freight transport and logistics.



## **Urban freight**

A city is not only a **destination**, but also an **origin** of freight movement:

- >20% to 25% of all truck-km in urban areas are outgoing freight,
- ≻ 40% to 50% is incoming freight and
- >25% to 40% is originated from and is delivered within the city.



## **Urban freight within freight chains**

- More than 50% of freight traffic (in tones) relates to distances less than 50 km
- 2 out of 3 orders (independently on the size) deal with urban freight transport
- 2/3 of total transport cost refers to deliveries within the urban area



# European freight traffic per distance class





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## Urban freight in the future: driving forces

- > 75% 80% of population lives in urban areas.
- Urban regions will continue to embrace multiple functions:
  - working
  - living
  - leisure
  - shopping
- Need for sustainable development and preservation of quality of life.
- Major generators of freight flows:
  - Consumption of goods importation from other regions;
  - Production of goods exportation to other regions;
  - Generator of waste.



### Urban freight in the future: driving forces

- Changes in societal values, culture and lifestyles
- Relocation of production (Asia, Eastern Europe, etc).
- Changes in the Logistics and Supply Chains
  - Increase of distance between production and consumption points
  - Just in Time
  - Decrease of load factor (?)
  - Reverse logistics
- Emerging of new schemes
  - E-commerce
  - Home delivery
  - Social Networks (increasing power of buyers)
- Major technological developments (TV, Internet, Mobile phones, etc)



## **Urban freight in the future**

- According to EC long-term forecast, freight transport will grow up to 80% by 2050 (EC, 2012).
- Estimates put logistics at 12% of the total cost in the manufacturing sector and at more than 20% in the retail sector (EC, 2007).
- Urban freight is expected to increase.

Urban goods movement refers to a complex environment: difficult to organize, difficult to modernize



## City Logistics: a tool to optimize... "last mile" logistics

- > An interdisciplinary approach
- Relevant concepts: sustainability, green transport, green logistics, "decoupling traffic and economic growth", reengineering, Intermodality.
- Large variety of actions and plans



Through a "transport system" approach, interventions needed at the levels of:

- Infrastructure
- Transport means
- Equipment and (new) Technologies
- Traffic flow organization
- Land use organization (land uses generate traffic)



## **Technical approach**

#### <u>Objective</u>:

- Reduction of the total nb of vehicle-kilometers travelled to satisfy the demand
- Reduction of emissions

Instruments:

- Modal shift policies
- Promotion of New technologies
- Promotion of alternative fuels
- Traffic management
- Alternative Land Use planning



## **Best Practices in City Logistics**

According to the European experience, three (3) main interventions, coordinated:

- Dedicated infrastructure for city logistics (e.g. Distribution Centers, Urban Consolidation Centers)
- Traffic restrictions traffic reorganization (e.g. Low Emissions Zones)
- Alternative vehicle combustion technologies (electric vehicles, CNG etc) or non motorized transport



#### **Example 1: Distribution Centers**

- ... a specific category of Logistics Centers, mainly focusing on the preparation of "last mile" delivery operations.
- They are "Interfaces" between long distance and short distance (urban) transport operations.
- They allow reduction of externalities through optimized flows of smaller trucks entering the city.
- Local authorities tried to implement Distribution Centers over the last two decades.
- The major potential beneficiaries of Distribution Center are independent and small retailers as well as operators making small multi-drop deliveries especially in areas in which constraints on delivery conditions exists (e.g. restricting regulations or congestion).



#### **Example 1: Distribution Centers**

One of the most exemplary Distribution Centers in Europe is **Binnenstadservice (BSS)**, a Distribution Center **at Nijmegen (Netherlands)**.

<u>The mission</u>: to provide logistical services to local inner city stores, regional consumers, carriers and local government.

<u>The objective</u>: to minimise the number of trips through the city center.

Business plan:

- Retailers do not have to pay for BSS' basic service, i.e. receiving goods and delivering these goods to the store at the time the store-owner likes.
- BBS' viability is based on extra services related to storage, home deliveries, return logistics etc

<u>History</u>:

- BSS started with only twenty clients in April 2008. The number of connected stores increased to 98 after one year, and it is continuously increasing as does the delivered volume.
- Since April 2009 it operates without financial governmental support.



#### **Example 1: Distribution Centers**





#### Example 2: electric vehicles Concorde Square

- Development of an urban warehouse (800m2), in an underground parking lot, under the Concorde Square
- □ Transport company: Chronopost
- Services: Urban delivery
- □ Goods: Small packages
- Electric vehicles







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#### Example 2: electric vehicles Concorde Square

#### Without Concorde ULS

With Concorde ULS





- □ Distance travelled reduces in 75%
- Less noise and pollution
- ☐ No change in costs
- □ Improvement in quality of service



#### Example 3: non motorized transport La Petite Reine

- La Petite Reine is a private company of urban distribution of goods using bicycles
- □ Each bicycle can carry up to 1.5 m3 and 190kg
- Urban consolidation centre, in the centre of the distribution area





#### Last mile green logistics

#### An integrated approach:





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#### **Natural Gas Vehicles**

Due to recent evolutions in geopolitics, the potential use of Natural Gas Vehicles (NGV) in Cyprus might be of particular interest...

- NGV technology: already technologically mature compared to electric vehicles
- It can be also used through bi-fuel engines; conversion's cost is low.
- Significant advantages of natural gas:
  - energy performance
  - transportation cost savings
  - environmental impacts
  - affordable investment.



#### **Natural Gas Vehicles**

#### **Natural Gas Properties**

- CNG (Compressed Natural Gas) is supplied in weight terms (Kg)
- 1 Kg of CNG is energetically equivalent to 1,77 liters of gasoline and 2,004 liters of LPG (Liquefied Petroleum Gas)
- Thermal power of CNG is higher than LPG; longer distances with CNG

1kg of Natural Gas equals to: 1,77 liters = 0,55€/liter

- Current prices in Greece:
  - CNG: 0,98 € / kg (including VAT)
  - LPG: 0,93 €/liter (average price in Athens metropolitan area)
  - Gasoline: 1,410 €/liter
  - Diesel: 1,350 €/liter



#### Towards a City Logistics strategy...

#### ... in Cyprus.

- Integrated transport and land use planning
- Development of dedicated city logistics infrastructure, with development of appropriate Business Plans
- Promotion of alternative combustion technologies and/or non motorized transport
- Traffic management with various restrictions
- Promotion of new information technologies

<u>Aiming at a substantial restriction of externalities, sustainability, combination of both</u> logistics efficiency and quality of life.

#### Development of <u>Logistics Master Plans</u>: Λευκωσία, Λεμεσός, Λάρνακα, Πάφος etc

