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Policies and freight governance
a review

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VREF workshop

Key figures

European level

- 34% of overall tons·km
- 50% of tons·km transported by road
- 20% of total road flows
- 30% of freight trips within 50 km
- 80% of freight trips within 80 km

Environmental impacts on Italian cities

	SO_2	NO_x	PM10	CO	VOC
Passenger	8.100	125.800	6.400	2.687.000	533.000
Freight	2.400	71.500	7.100	89.500	20.200
% incidence	23%	36%	53%	3%	4%

Source: Amici della Terra (2003)

Key figures

An **inherently inefficient** system:

Declared loading factor	# daily trucks	% incidence
empty	1157	30,2
25%	1373	35,8
50%	729	19,0
75%	251	6,5
full	240	6,3
not declared/unknown	83	2,2

Source: Gattuso and Da Rios (2003) – Survey in the metropolitan area of Milan

Some causes:

- decrease in the number of warehouses within retailers' shops
- inadequate pick-up and delivery stalls in urban areas
- lack of vehicle routing optimization and planning due to missing information from the demand side and shortcomings from the supply side
- excessive fragmentation of the freight supply market

Actors and objectives

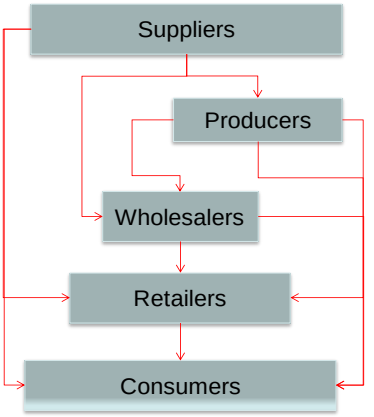
Retailers and freight receivers	• **Fast, effective and frequent pick-up and delivery** • **Reduced costs and fares**
Consumers	• **Large variety of shops in urban centres** • **Competitive prices with respect to extraurban malls** • ***(indirectly)* sustainable and ecologic urban environment**
Carriers (own account)	• **Freedom of self-provision and hawking in urban areas** • **Effective and easily available logistics and transport facilites**
Carriers (third party)	• **Support to internal optimization (e.g. routing, load factors), mainly for large carriers** • **No restrictions in time and space for delivery**
Real estate logistic providers	• **Interest in the involvement in real estate logistics business, in urban and extra-urban contexts**
Public entities and control bodies	• **Need to preserve the indirect impacts on residents in the urban environment (e.g. pollution, congestion)** • **Need to optimize the economic activities and to guarantee equal competitiveness in the market**

A complex system

A large number of supply chains and a complex interaction of physical flows – much larger than the urban area - between the relevant actors:

Relevant supply chains:

- Construction
- Retailers
  - Perishable
  - Non perishable
- HoReCa
- Newspapers
- Pharmacy/health
- E-commerce
- Parcels/couriers
- Post services
- Department stores
- …



Urban freight policies at a glance

A possible taxonomy amongst the large number of classifications available in the literature:

- **restrictive policies**: access to the urban centre, regulation of time and space limitations for pickup and delivery, other traffic policies, …
- **incentive policies**: tax breaks, special dispensations for low emission vehicles, seals of quality, …
- **infrastructural policies**: urban distribution centres, transit points, pickup and delivery designated areas, use of rail, …

ICT play two major roles throughout all possible policies:

- **enabling** the implementation of policies otherwise inapplicable;
- **multiplying** the effects of the policies

Key roles played also by:

- **public engagement** procedures for boosting the adoption of policies;
- **complex modelling tools** needed for supporting planning and design;
- normally just a **mix of policies** leads to adequate results

Restrictive policies: outline

Conceptually based on the definition of specific limitations for the access to (portion of) urban areas of freight vehicles for pickup and delivery:

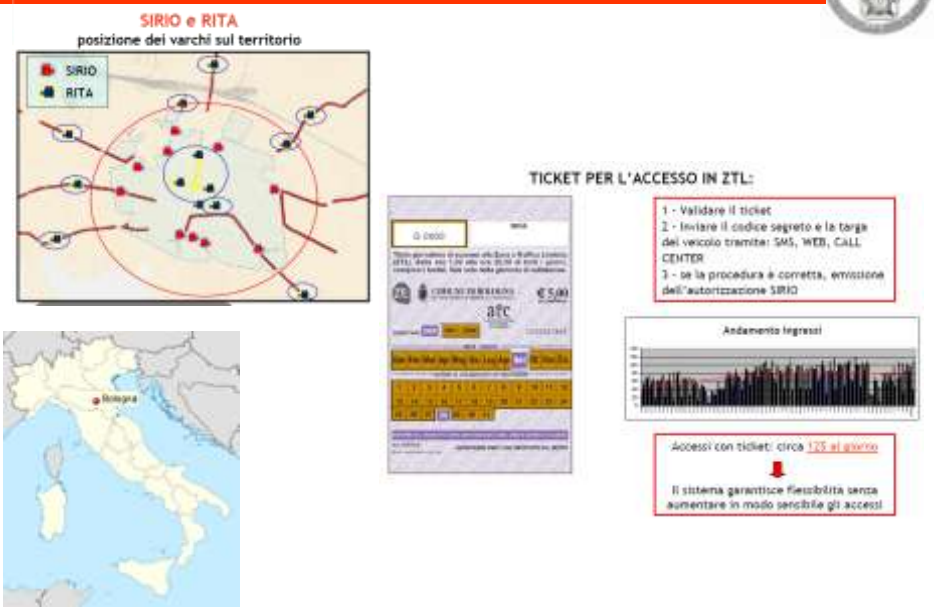
- the most adopted and easily implementable policy
- simple to complex implementation schemes, based on:
  - time constraints (e.g. access allowed just in certain hours)
  - space constraints (e.g. access allowed just in certain areas)
  - vehicle-based characteristics (e.g. pollutant emissions, average loading factors, size)
- a large number of available pricing structures:
  - flat vs. consumer, equal vs. differentiated (e.g. by number of trips, size of vehicles, o-d pair, loading factor, area and time of entrance)
  - very complex price patterns possible through advanced ICT
  - possibility of introducing more complex and economically sustainable systems based mainly on the adoption of the so-called *mobility credits*

Restrictive policies: issues

Main issues/shortcomings:

- remarkable effects observable only for high fares
  - very likely risk of public protests against the policy
  - risk of increase of prices for customers and/or of delocalization of retailers towards more economic areas (depending on the relative strength of the involved actors)
  - simpler pricing schemes “cut off” all supply chains and actors independently of their efficiency or sustainable behaviour
- implementation costs may be high for complex ICT-based schemes

Restrictive policies: the example of Bologna



Restrictive policies: mobility credits

Main idea developed by *Fondazione Italiana Accenture* in early 2006

- each actor in the system owns a given amount of “mobility credits” which may be reduced or incremented depending on his mobility behaviour
- credits may be gained either through purchase (i.e. a form of pricing) or by adopting “sustainable” mobility choices
- simple to complex schemes may be designed

The only real application to date is proposed in the city of Genova:

- First experiments in 2006/2008 related to passenger transport
- Extension to urban freight from 2008 through the “Mercurio” implementation
- … but in March 2011 the project was suspended because of the negative results and the impacts on the retailers

Restrictive policies: mobility credits

- system related to a (limited) TLZ
- carriers and retailers involved
  - exchange of mobility credits
- participation on a voluntary basis
- pervasive and costly ICT needs

Incentive policies

Direct and **indirect** policies:

- towards carriers/logistics providers:
  - wide ranges of incentives for the renewal of the freight vehicles
  - bonuses for recognizable sustainable behaviour (e.g. optimized operations)
- towards retailers/customers:
  - bonuses and incentives for adopting less impacting pickup and delivery operations (e.g. own loading/unloading areas, willingness and flexibility in consignment times)
  - sustainable operational schemes (e.g. less frequent consignments)
  - necessity to provide themselves with minimum internal storage areas

Incentive policies

Main issues/shortcomings:

- normally the requested incentives for green vehicles on a large scale are difficult to be sustained through public funding, and a co-financing by private carriers is required…
- …this can be achieved just when restrictive policies are coupled to the incentives
- rent costs in urban areas are very high and there is a strong tendency by retailers in avoiding storage areas
- incentives should be extended to all relevant actors in order to provide for remarkable positive effects

Infrastructural policies

They are the (potentially) most impacting and cost-demanding policies:

- improvement of road infrastructures
- creating state-of-the-art designated areas for freight loading/unloading
- building new logistics facilities along the relevant supply chains:
  - Urban Distribution Centres (UDC) intended as main logistic warehouses which may act as consolidation centres just before the last mile pickup and delivery
  - Local Transit Points (LTP) which may be reached within few metres from the final destination and aims at serving small areas with very limited storage capabilities
- changing/upgrading the access to/from ports where applicable

Infrastructural policies

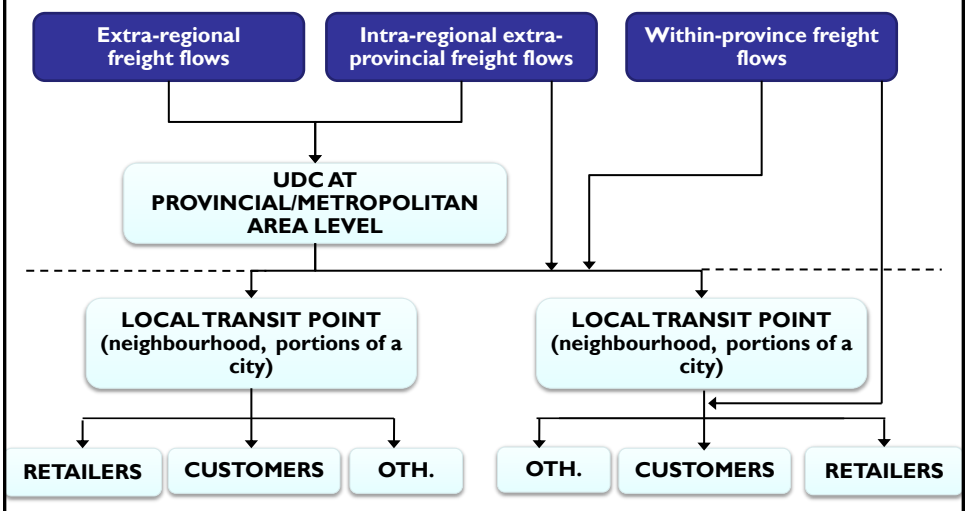
Pros:

- if effectively designed and implemented, allow for a significant optimization of the whole urban distribution
- they act on the structure of the relevant supply chains and therefore proper UDC and LTP-based distribution networks can be planned
- often freight villages and logistics centres are available close to the city, with a potential savings in the implementation and easier economies of scale

Cons:

- a significant number of actors may be economically affected by the addition of a further step in their supply chains
- the correct design of such infrastructures requires a very huge modelling effort, related to a much wider area with respect to the city
- not all freight flows are consistent with the implementation of UDC and LTP, mostly those with very close origins and destinations (→)

UDC and types of urban freight supply chain patterns



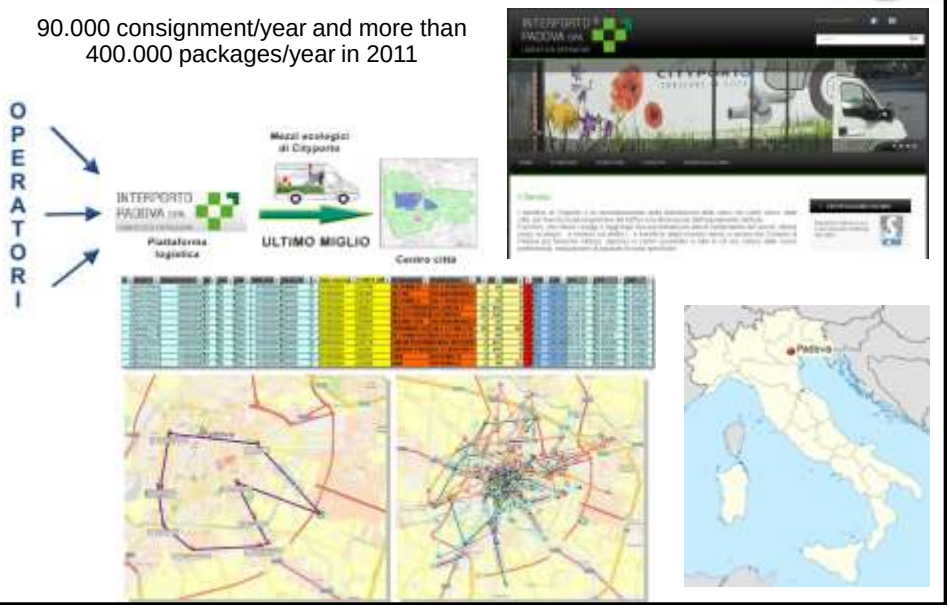
Infrastructural policies

Other implementation issues:

- return trips towards the UDC are much less optimizable than the distribution leg
- very large initial investments and often uncertainty on the break even
- UDC impact significantly on the operations of each single actor (mainly carriers, both own account and third party), forcing them to cooperate and integrate
- the variety of supply chains and commodities makes very difficult finding a general UDC structure useful for all
- the business model of the UDC (see after) is strictly related to the success of the initiative
- UDC and LTP requires large ICT implementations and complex interfaces with proprietary informative systems (customers and carriers)

UDC within freight villages: the example of Padova

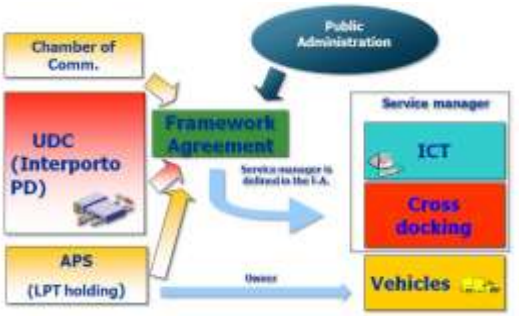
90.000 consignment/year and more than 400.000 packages/year in 2011



UDC within freight villages: the example of Padova

Main characteristics:

- green vehicles for last mile operated by *Cityporto* can enter the LTZ at all times for free
- the grant provided by local and regional authorities now is about 11% of the revenues
- a complex agreement allows all carriers and users to be equally served by *Cityporto*
- specific agreements for issuing the bill of lading have been defined



Source: Vaghi (2010)

Business models

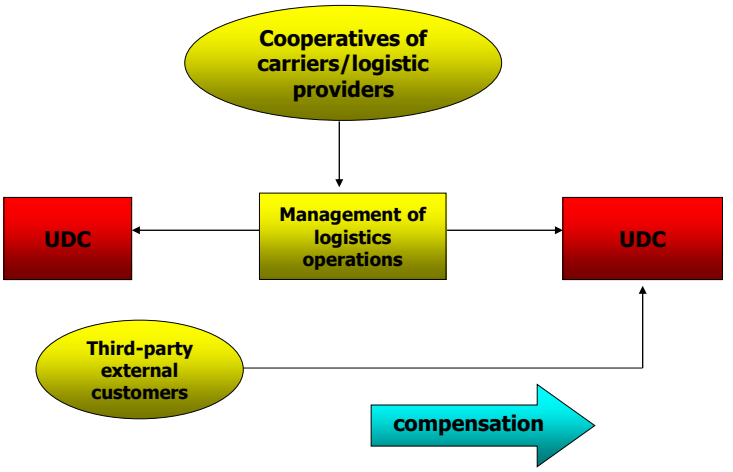
A key issue: which is the most effective **business model** for each of the proposed policies?

Four main options available:

- **entirely private** business model
- **mixed public/private** model
- **entirely public** model
- as the above, but with a **third party private UDC manager**

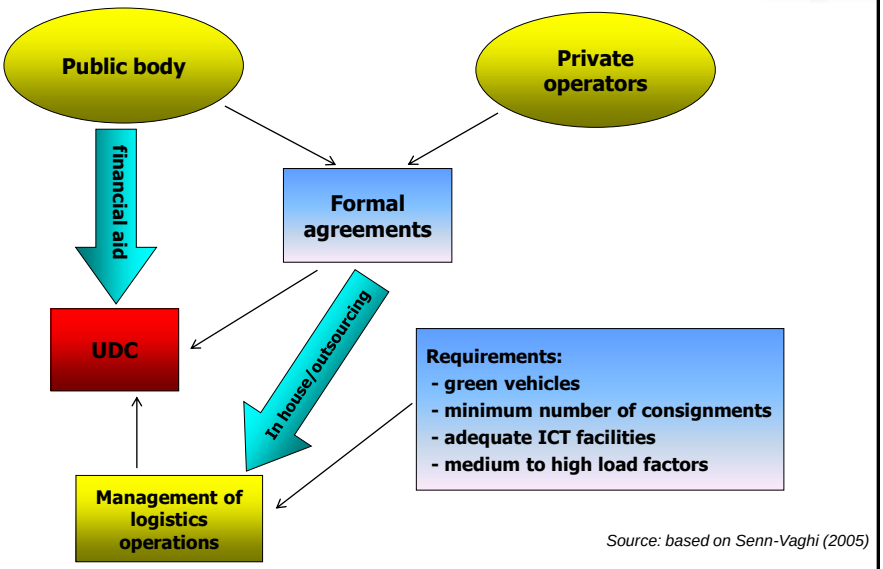
Depending on the most appropriate business model, proper **public engagement** procedures should be followed in order to provide for a practical implementation of the proposed policies.

Business models: entirely private



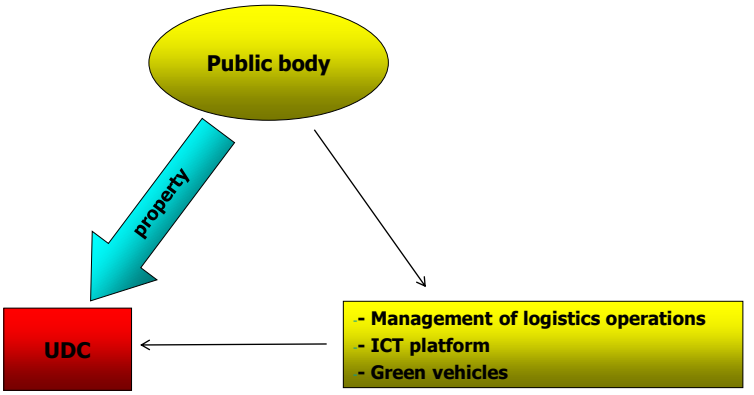
Source: based on Senn-Vaghi (2005)

Business models: mixed public/private



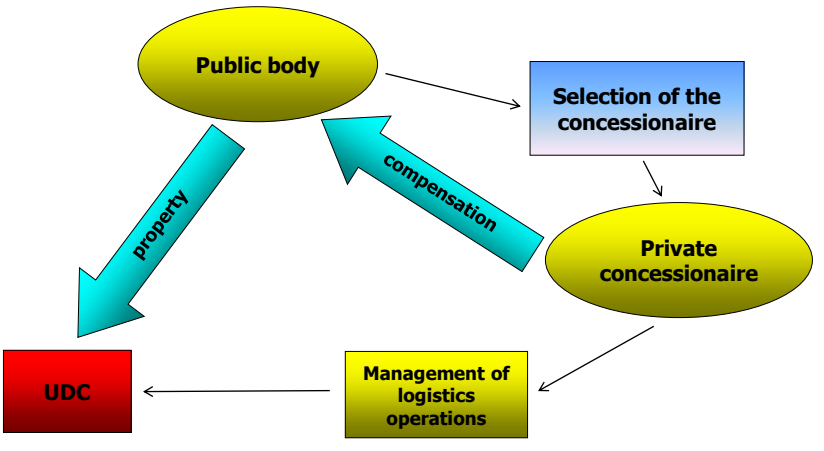
Source: based on Senn-Vaghi (2005)

Business models: entirely public



Source: based on Senn-Vaghi (2005)

Business models: public with private concessionaire



Source: based on Senn-Vaghi (2005)

Public Engagement

- **Public Engagement** (PE) is the process of identifying and incorporating stakeholder concerns, needs and values in the transport decision-making process.
- It is a **two-way communication process** that provides a mechanism for exchanging information and promoting stakeholder interaction with the formal decision-makers and the transport project team.
- The overall goal of engagement is to achieve a transparent **decision-making process** with greater input from stakeholders and their support of the decisions that are taken.

Advantages of PE

- increase in credibility and legitimacy for the public administration
- increase in sense of social responsibility among local communities towards projects
- increase in social equity
- facilitate coalitions on specific choices

Public Engagement

THE LACK OF PE MAY INDUCE THE DAD (DECIDE ANNOUNCE DEFEND) SYNDROME (e.g. Susskind et alii, 1983; Walker, 2009)

Administration takes a **Decision**/choice (the best project/plan), it **Announces** the project to the population and other stakeholders that have not been involved previously. This produces many oppositions and the Administration is obligated to **Defend** the decision against criticism, accusations and controversy without having the opportunity to improve the project (if only marginally)

LIMITS OF THE DAD:

- it fosters barriers
- It increase costs
- It increases times

Public Engagement: the 5 levels

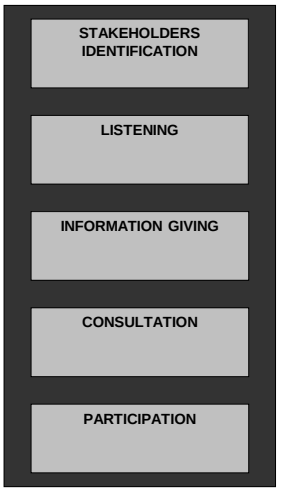
Stakeholders identification: e.g. authorities, local communities, etc.

Listening: systematic analysis of the current social, cultural and economic conditions with a direct impact on stakeholders.

Information giving: information relative to the project provided by the stakeholders.

Consultation: decision-makers listen to the different points of view and interact with the stakeholders.

Participation: extension of the consultation level where the groups, directly interested, become joint partners of the project and in the project implementation. They take part in making the final choice.



Public Engagement

PE levels and tools (1/2)

PE TOOLS	PE LEVELS				
	STAKEHOLDERS IDENTIFICATION	LISTENING	INFORMATION GIVING	CONSULTATION	PARTICIPATION
Information giving and gathering					
Printed public information materials					
Letter			xxx		
Poster			xxx		
Brochure and Newsletter			xxx		
Tecnical report			xxx		
Telephone and media					
Telephone		xx	xx		xx
Local radio and TV shows		xx	xxx		
Newspapers and articles		xx	xxx		
Internet					
Internet website			xxx		xx
Web-based forum	xx	xx	xxx	xx	xx
KonSULT				xxx	xxx
Surveys					
Questionnaire surveys		xx		xxx	
Key person interviews	xxx	xxx		xx	

Public Engagement

PE levels and tools (2/2)

PE TOOLS	PE LEVELS				
	STAKEHOLDERS IDENTIFICATION	LISTENING	INFORMATION GIVING	CONSULTATION	PARTICIPATION
Interactive engagement					
Public events					
Exhibition			xxx		
Public meeting	xx	xxx	xxx		
Engaging selected stakeholders groups					
Study tour/Focus group		xxx		xxxx	
Workshop					
Citizen jury					
Technical meeting	xxxx	xx			
Deliberative polling				xxx	xxx
Spreadsheets					xxx
GIS-computer based				xxxx	xxx
Engaging large stakeholders groups					
Stakeholder conference		xxxx	xxx	xx	xxx
Weekend event				xxx	xxx
Open space event				xxx	xxx
Referendum					xxx
RAP-GIS				xxxx	

ICT: enablers and multipliers

A wide range of relevant ICT applications for urban freight:

- vehicle-related: e.g. devices for tracking/tracing, software/tools for en-route optimization, V2I, …
- freight-based: e.g. devices for tracking/tracing, …
- Infrastructure-based: e.g. warehousing management software and systems, interfaces between operative systems of different actors, control of access to/from ZTL gates, …

Various levels of applications:

- strategic
- tactical
- operational

(some) conclusions

- UDC/LTP and restriction to LTZ access are the most adopted policies
- normally, a mix of policies should be designed in order to reach a satisfactory effectiveness
- specific business models involving both public bodies and private stakeholders should be envisaged, as a necessary condition
- in any case, it is important to establish who, amongst all the actors, is actually "making the rules"
- ICT applications play a key enabling and multiplying role
- the technical design of the policies should account for the variety of commodities and of actors (multi-user CBA and MCA?)
- consistently, a key issue is the correct identification of the target commodities and clusters
- complex mathematical models and DSS are needed in order to avoid side and counterintuitive effects…
- … however the complexity of the models should be adapted to the effective needs deriving from the different policies under analysis

Eco-rationality and false friends

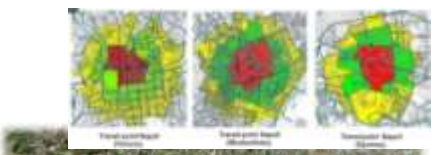
AN EXAMPLE

➢**Transit-point and light goods vehicles for urban distribution:**

BASE SCENARIO

a. **Aims**
- ✓Reduce traffic congestion
- ✓Reduce traffic emissions (CO2 and PM10)

b. **Policies**
- ✓new transit points
- ✓new vehicle paths
- ✓no Heavy trucks for urban delivery



❑**Impacts**
- ✓ - 5% traffic congestion reduction
- ✓ + 10% traffic fuel consumption
- ✓ + 5% green gasses emission (eqiv. CO2)
- ✓ + 11% fine particles emission (PM10)

Increase in paths length

Eco-rationality and false friends

AN EXAMPLE

➢**Transit-point and light goods vehicles for urban distribution: ALTERNATIVE SCENARIO**

a. **Aims**

- ✓Reduce traffic congestion
- ✓Reduce traffic emissions (CO2 and PM10)

b. **Policies**

- ✓transit points location
- ✓new vehicle paths
- ✓no Heavy trucks for urban delivery
- ✓**renewal of Small trucks vehicle fleet into electric vehicles** (*new options*)

❑**Impacts** (renewal of 35% of Small trucks into electric vehicles)

- ✓ - 5% traffic congestion reduction
- ✓ ≈ 0% in total traffic fuel consumption
- ✓ ≈ 0% in total green gasses emission (eqiv. CO2)
- ✓ - 3% in total PM10 emission (- 11 tonn./year)