Global challenges in smart logistics – Innovation driving supply chain control
13 November 2013, Utrecht

Urban Freight Transport Management for Sustainable and Liveable Cities

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Outline

1. Introduction
2. What is city logistics?
3. Visions for city logistics
4. Best practices
5. Conclusion

1. Introduction
Urbanisation

- About half of the World's population (7 billion) live in urban areas
- The convergence of people and resources into urban areas for better lives--- job, meeting, education, entrepreneurism, culture, transport, medical care….
- However, the growth of cities generates problems on traffic congestion, environment, public health, safety and security… --more serious in mega-cities

- Urban freight transport is an essential element for supporting efficient economic and social development in urban areas
- In addition, we face the aging society which requires more costs for medical, nursing and rehabilitation service as well as delivering daily commodities to elderly people

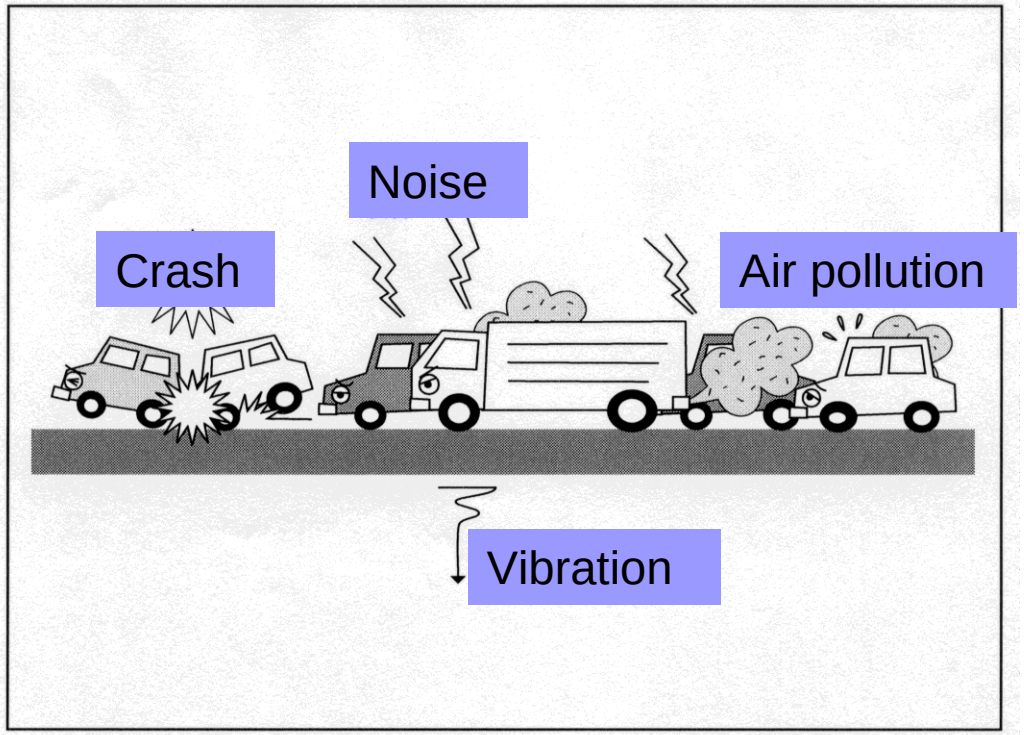
Challenging issues (1)

- Competition
- Efficient logistics systems --- Just In Time transport systems
- Freight carriers --- better services with lower costs
- Shippers --- designated time windows

Commercial logistics

Challenging issues (2)

- Increase in urban freight transport
  - Congestion
  - Negative environmental impacts
  - Crashes
  - Energy consumption

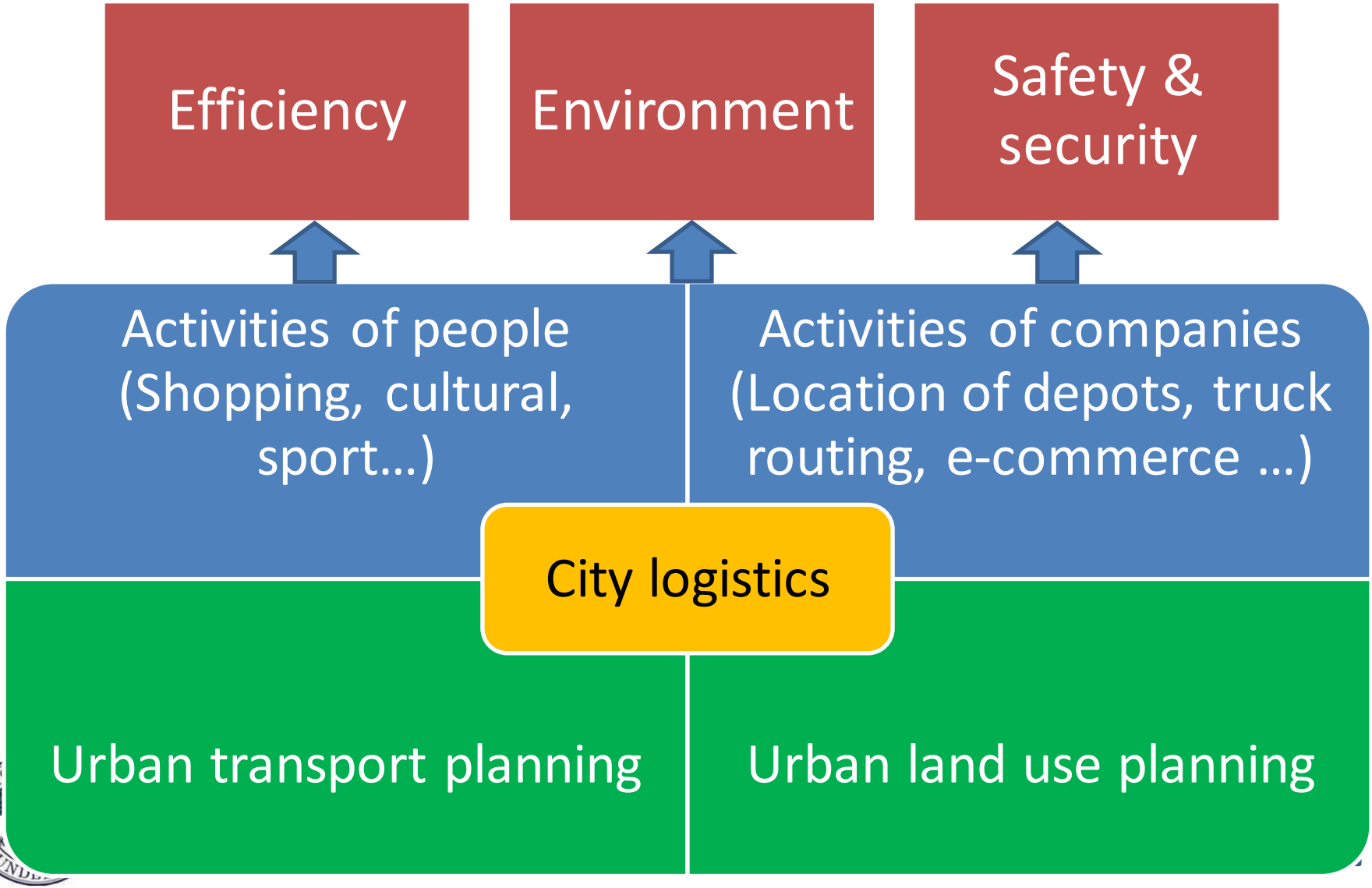


Intervention of public authority is needed

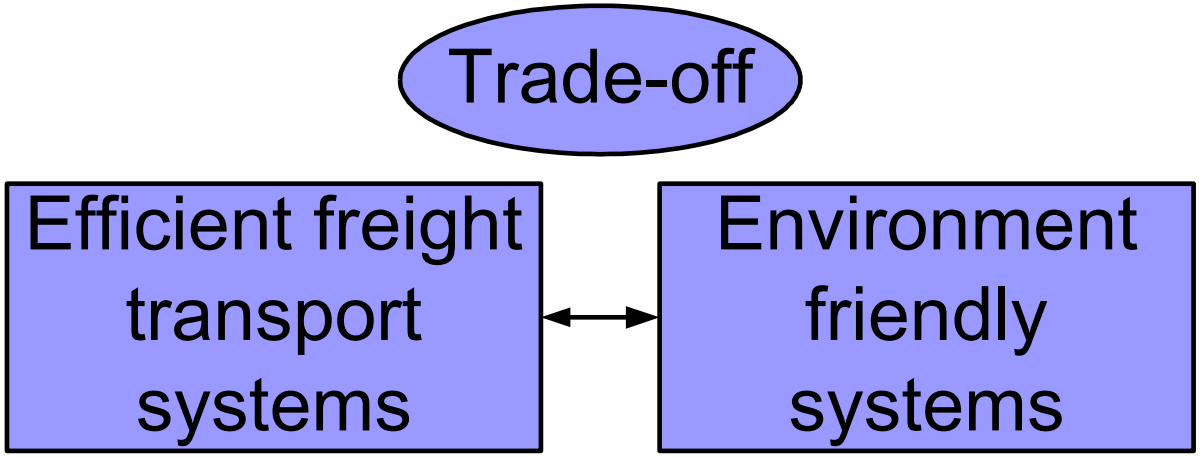
Smart solution by city logistics

- City logistics play an important roll for balancing the economic growth of cities and social and environmental issues
- Because city logistics provides the basic framework for social, cultural activities of people and economic activities of companies
- However, many urban planners and politicians have overlooked urban freight transport

Framework for activities of people and companies in urban areas



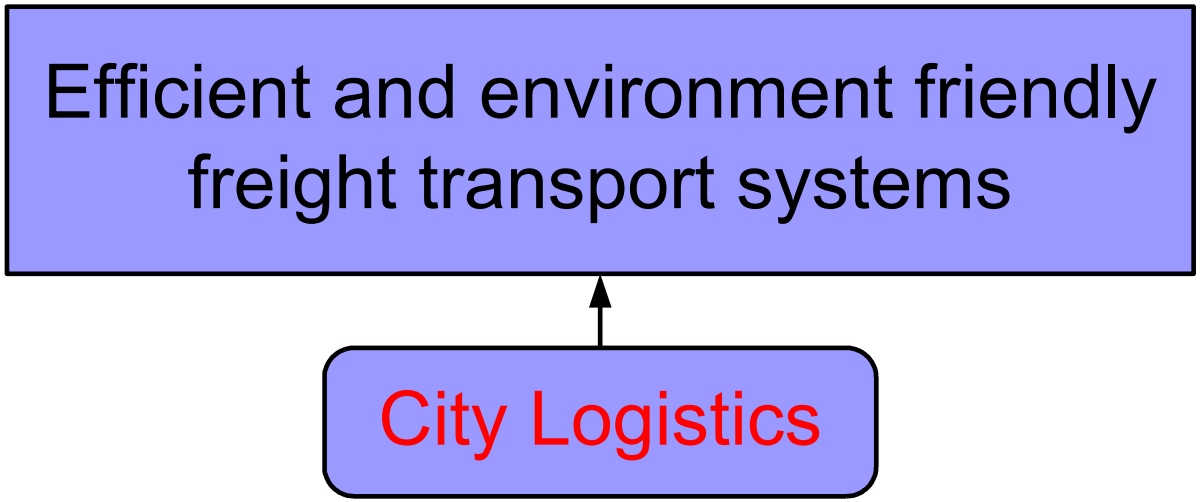
(20th century)



Efficiency and environment

(function of city logistics)

(21st century)



20th century

- Any major reduction in environmental impact does not seem possible without putting the logistics innovations themselves into reverse (J. Cooper, 1991)

21st century

- ICT (Information and Communication Technology), e-commerce (B2B, B2C)
- Development and deployment of ITS (Intelligent Transport Systems)
- SCM (Supply Chain Management)

  ERP (Enterprise Resource Planning)

  CRP (Continuous Replenishment programme)
- Outsourcing of freight transport---3PL, 4PL

Cost structure

- Increasing efficiency as well as reducing negative social and environmental impacts can be represented by reducing social costs

- (Social cost) = (Logistics cost) +

(Congestion cost) + (Environmental cost) +

(Traffic safety cost) +....

Internal cost

External cost

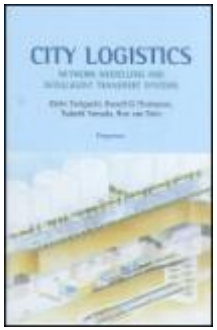
2. What is City Logistics?

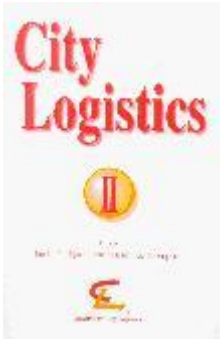
- City logistics is the process for totally optimising the logistics and transport activities by private companies with the support of advanced information systems in urban areas considering the traffic environment, its congestion, safety and energy savings within the framework of a market economy

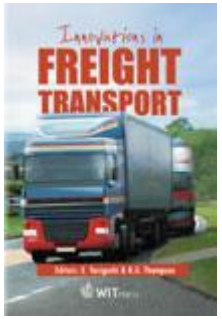
(Taniguchi, Thompson, Yamada and Van Duin, City logistics-Network modelling and Intelligent Transport Systems , *Pargamon*, 2001)

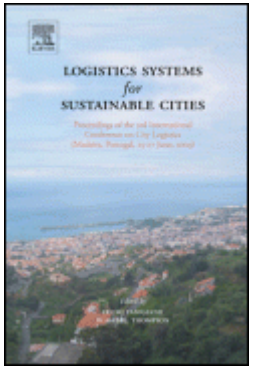
International Conferences on City Logistics

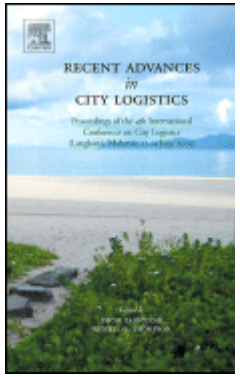
- Organised by Institute for City Logistics
- In Cairns (1999), Okinawa (2001), Madeira (2003), Langkawi (2005), Crete (2007), Puerto Vallarta (2009), Mallorca (2011)
- The 8th International Conference on City Logistics, Bali, Indonesia, 17-19 June 2013

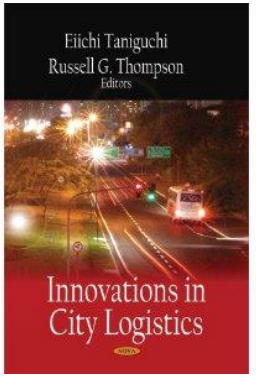




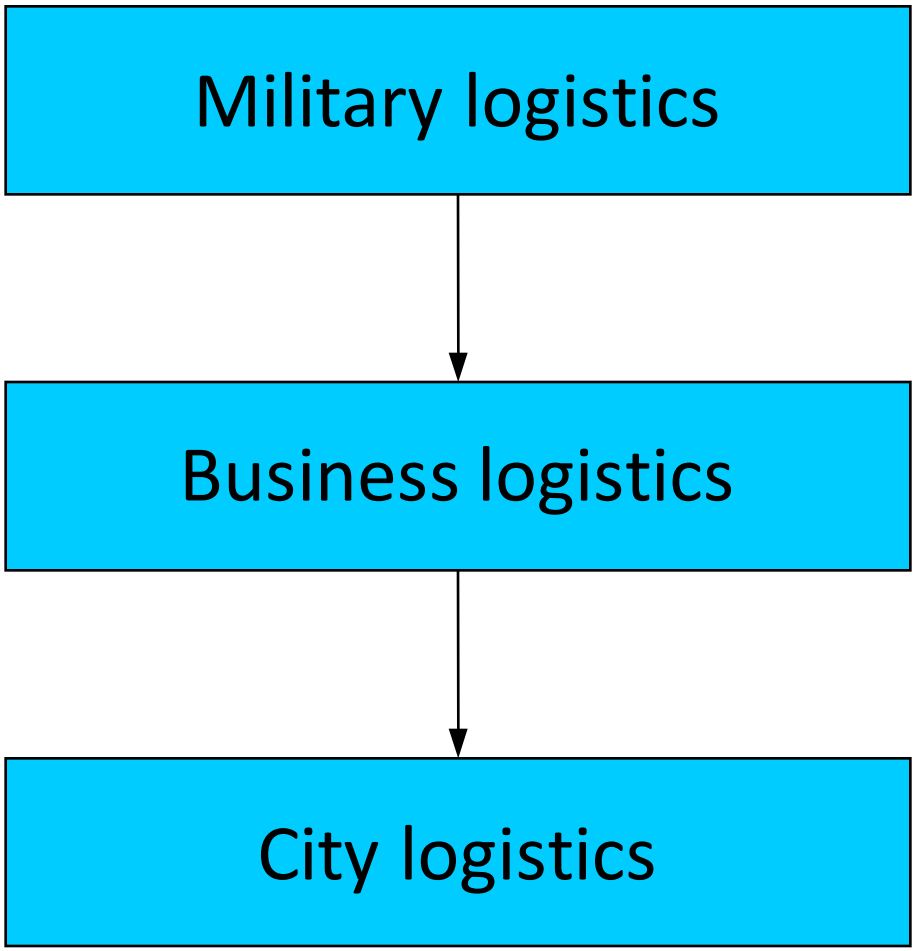








History of logistics

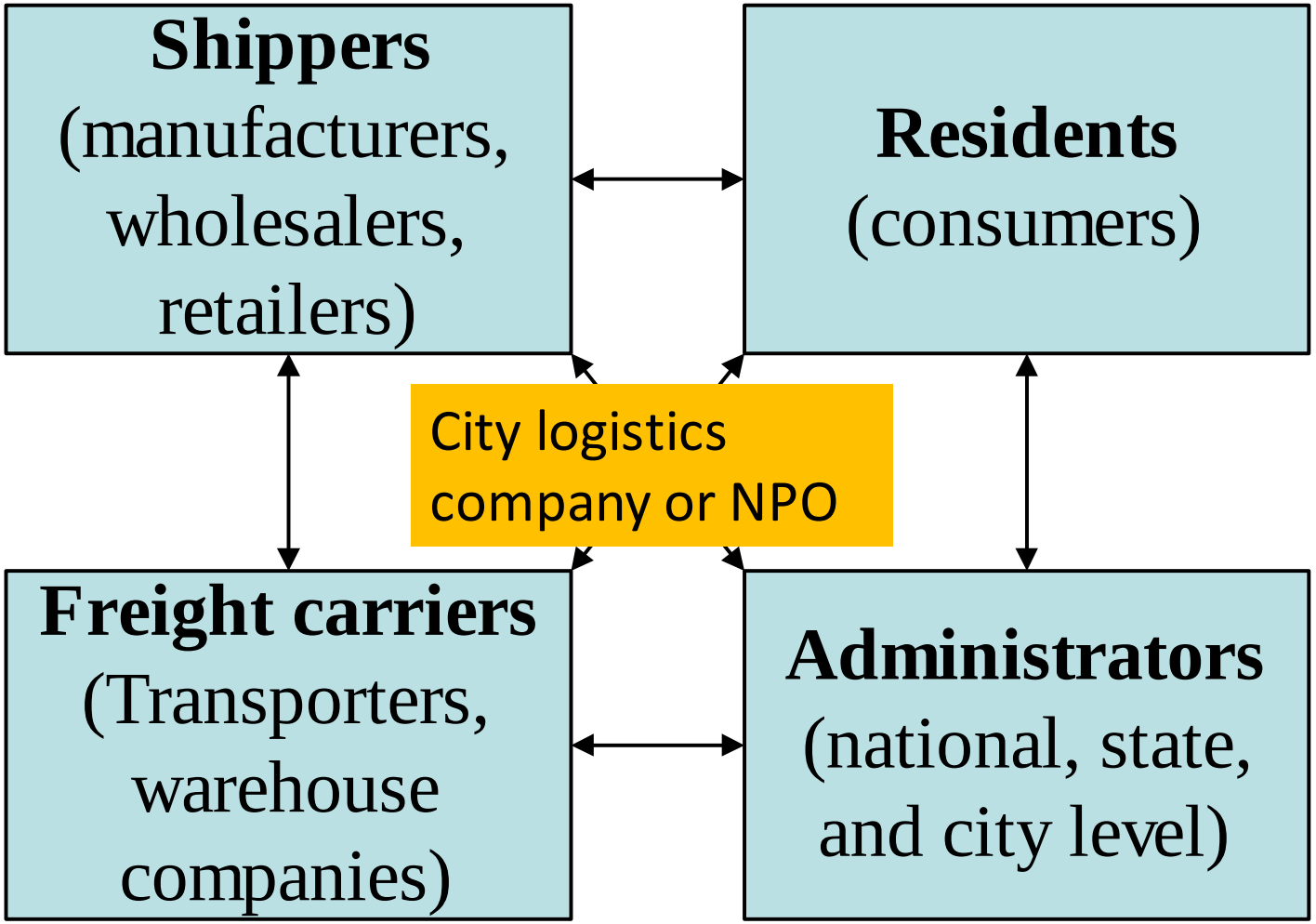


Humanitarian logistics

e-logistics

Green logistics

Stakeholders of City Logistics



Characteristics of City Logistics

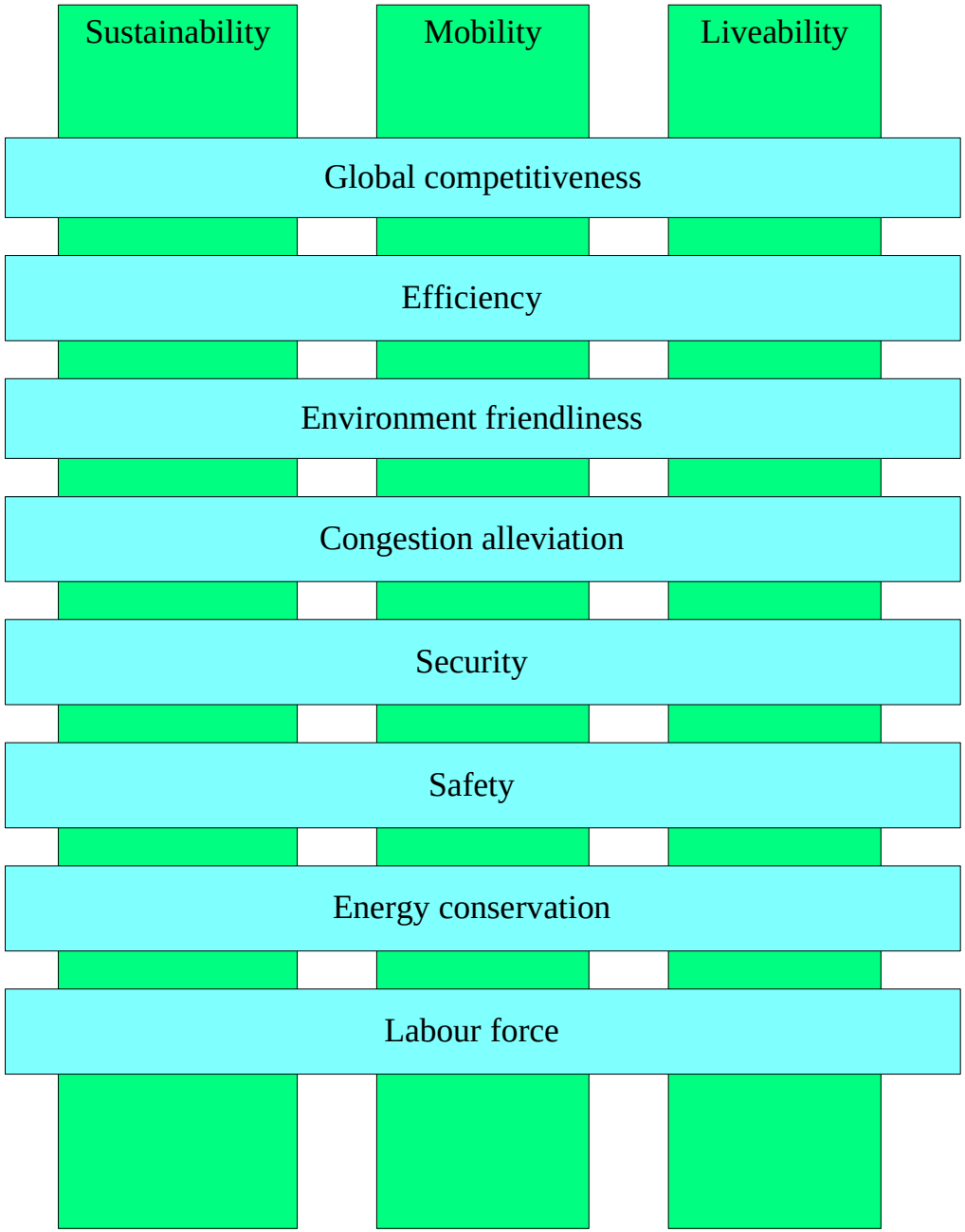
- Total optimisation taking into account environment, congestion, safety, energy etc.
- Relatively free activities of companies supported by public sector through deregulation
- Full utilisation of advanced information techniques including ICT and ITS
- Mindset of Co-opetition

3. Visions for city logistics

- We need visions for city logistics to establish efficient and environmentally friendly urban logistics systems through the process of city logistics

Resilience

Visions for city logistics

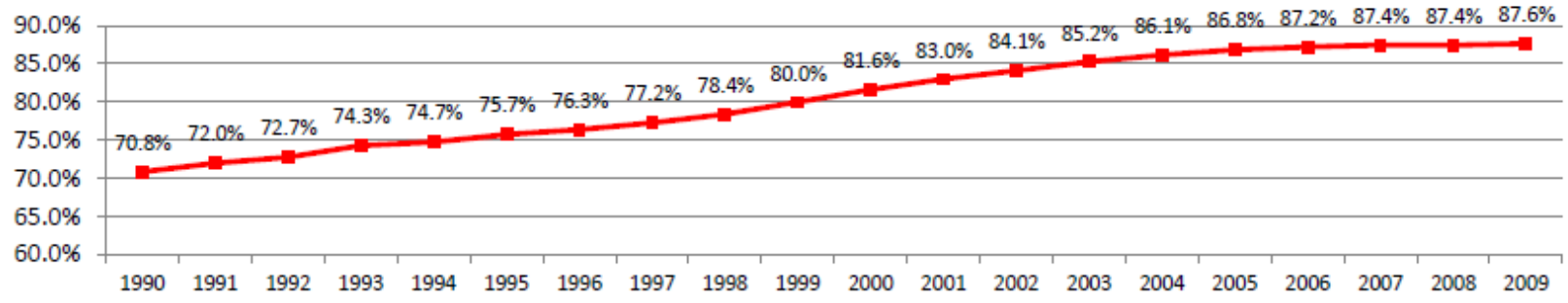


Essential viewpoints

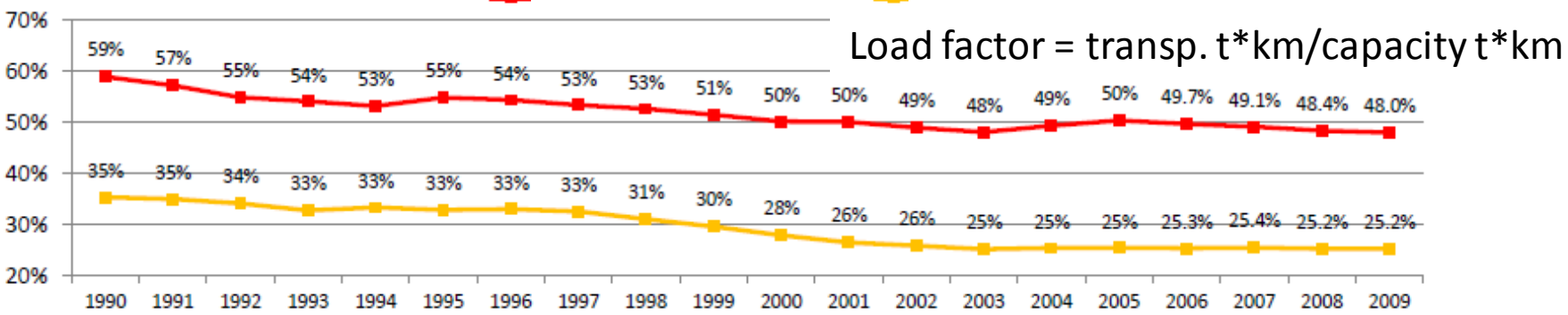
- ICT, ITS and city logistics
- Urban planning and city logistics
- Land use planning and city logistics
- Units of urban freight transport planning
- Subsidies and additional charges from the public

Change in rate of commercial use trucks and load factor of truck operation in Japan

Rate of commercial use trucks

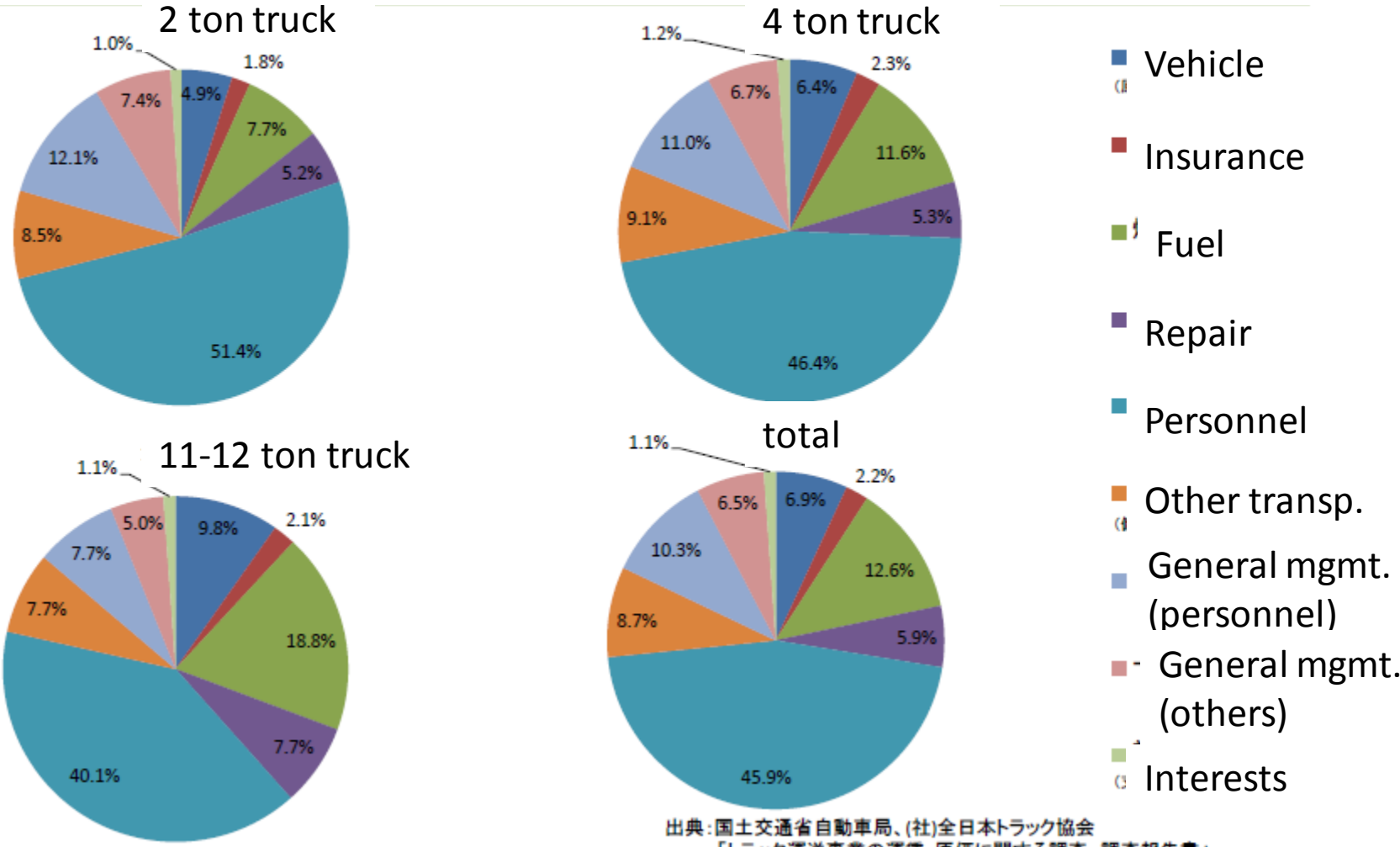


Load factor of truck operation



Source: MLIT

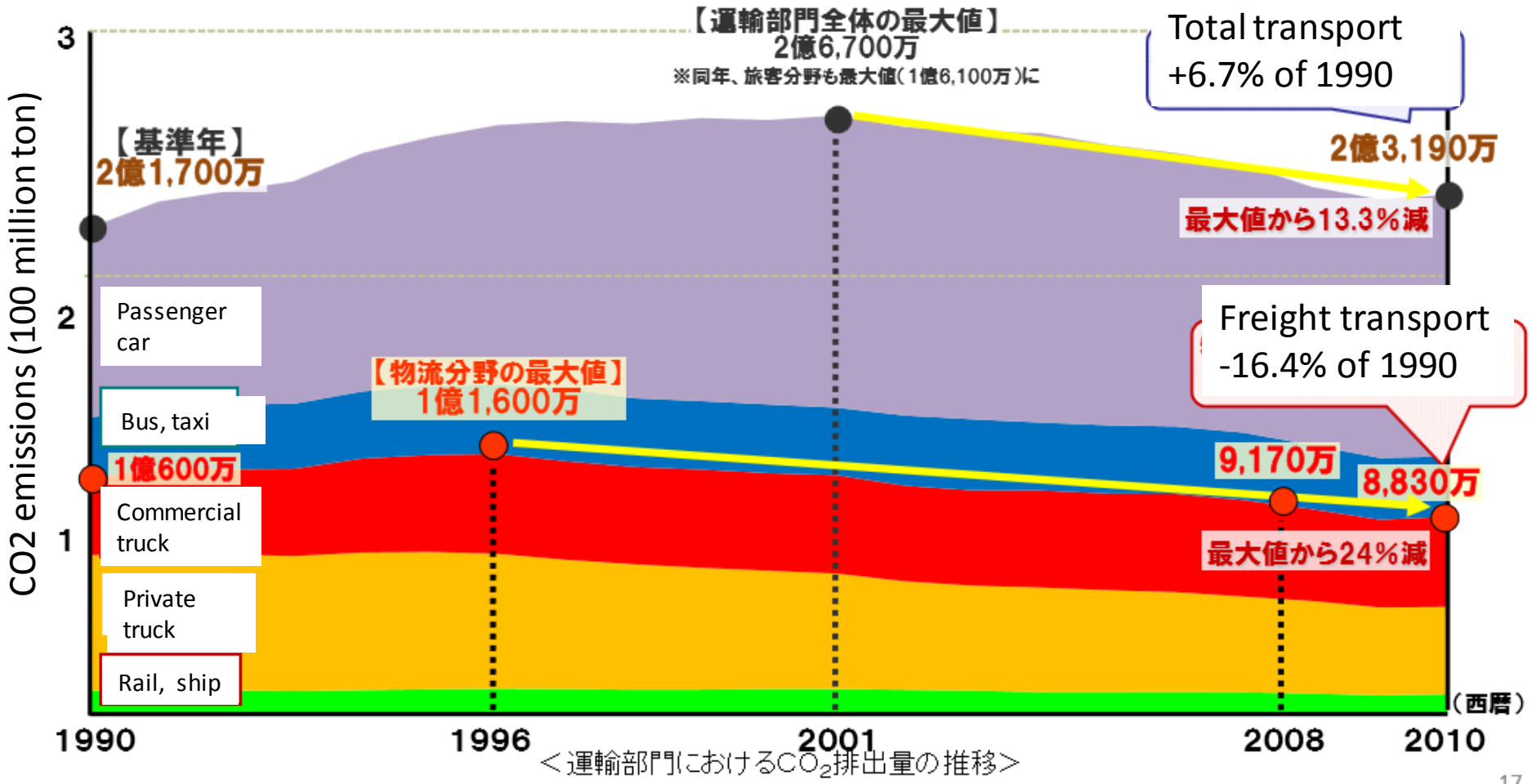
Costs of operating trucks



出典:国土交通省自動車局、(社)全日本トラック協会
「トラック運送事業の運賃・原価に関する調査　調査報告書」
(調査期間:2011年1月～3月)

Source: MLIT, Japan Truck Association

Change of CO_2 emissions in transport sector



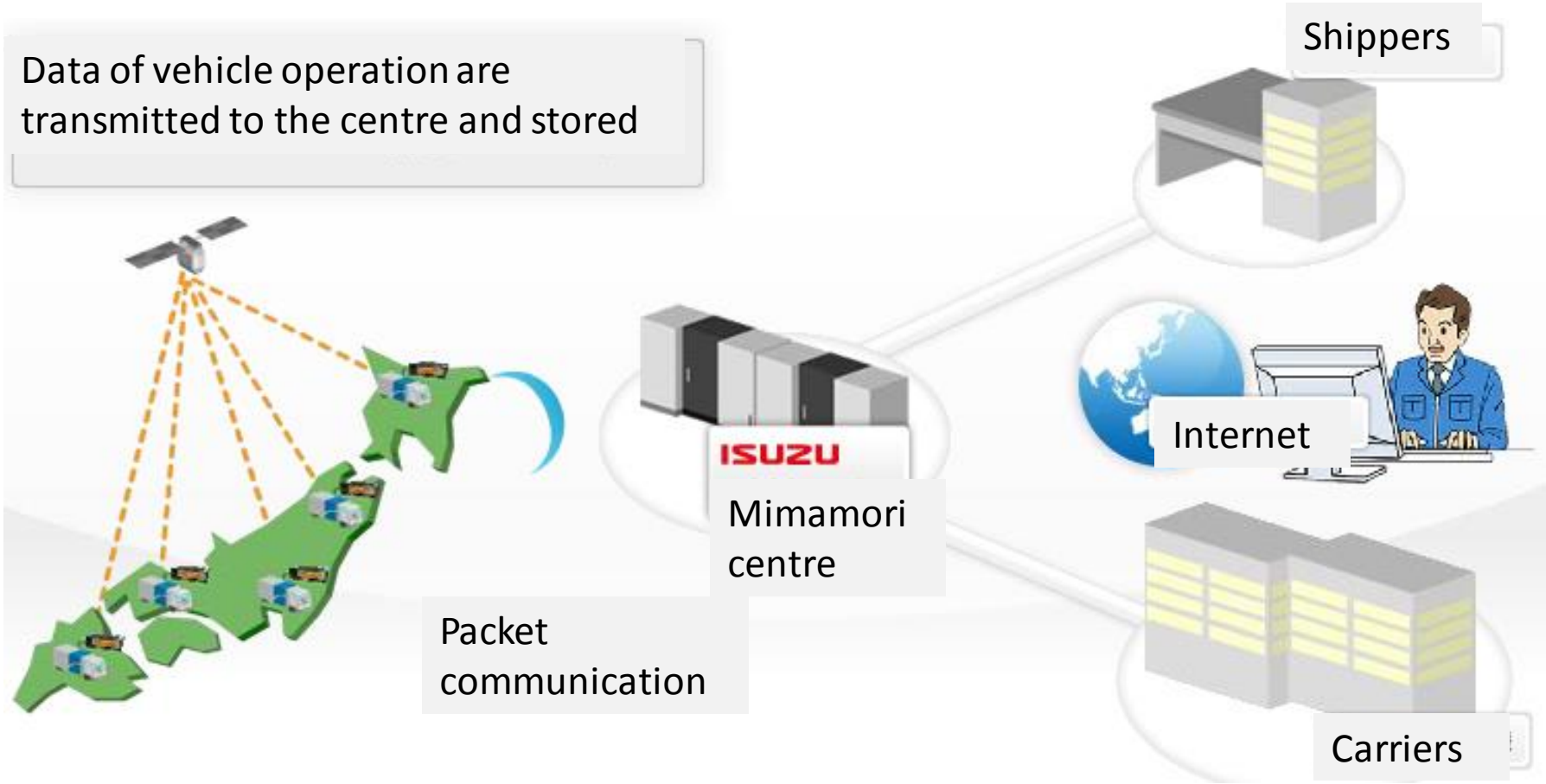
＜運輸部門におけるCO_2排出量の推移＞

温室効果ガスインベントリオフィス「日本国温室効果ガスインベントリ報告書」から作成

Two driving forces to promote city logistics schemes

- Development and deployment of Innovative technology (ICT and ITS) in logistics area
- Behaviour change of shippers and freight carriers associated with corporate social responsibility (CSR)

Example of application of ICT and ITS for logistics operation (Isuzu)

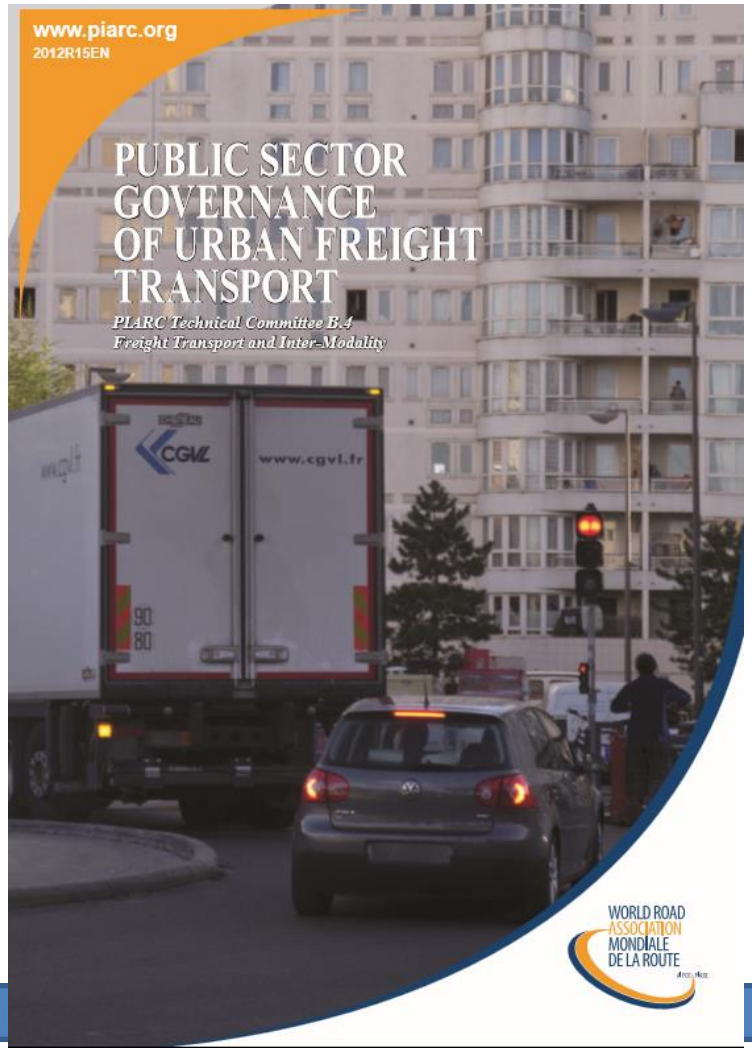


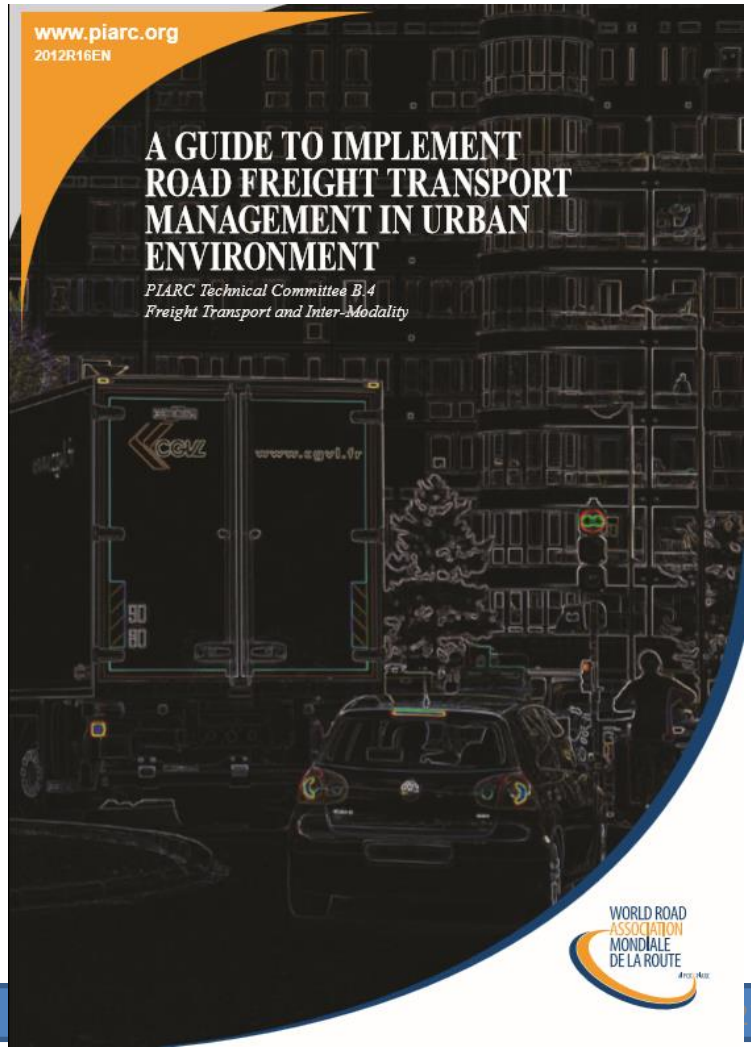
Source: Isuzu

Environmental management in logistics

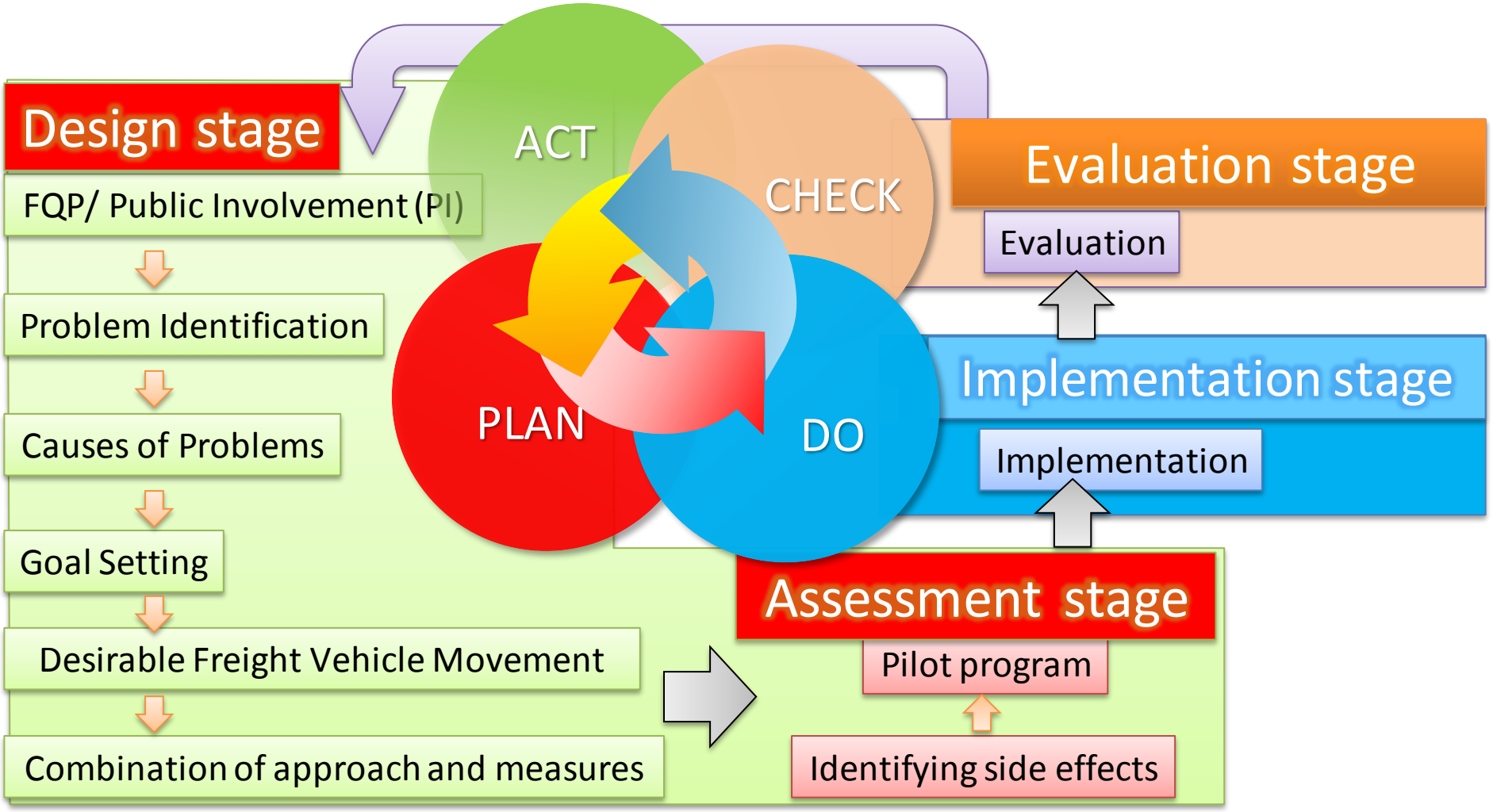
- ISO 9001 & 14001 series
  - Plan, do, check and action procedure
- Green management schemes for small and medium size enterprises
- CSR (Corporate Social Responsibility)

Publications by World Road Associations (English, French, Spanish, Japanese)





Procedure of urban freight transport management



Source: PUBLIC SECTOR GOVERNANCE OF URBAN FREIGHT TRANSPORT, PIARC 2012

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Approaches to urban freight transport management

Approach	Example
(1) **Infrastructure**	Development of bypasses/ring roads, urban distribution centers, loading facilities
(2) **Regulatory**	Introduction of fuel taxes, road user charge, dedicated freight Impose vehicle restrictions Introduce congestion charging
(3) **Logistical**	Use of small delivery vehicles Improved terminal operations Improve driver competencies
(4) **Co-operative**	Form freight partnerships load sharing systems (increase load factors) Joint delivering
(5) **Technology**	Use of electric delivery vehicles Use of GPS and FTMS Implement a vehicle parking reservation system
(6) **Behavioral**	Implement anti idling messages Improve social acceptance of urban freight activities Use of recommended truck routes

Source: PUBLIC SECTOR GOVERNANCE OF URBAN FREIGHT TRANSPORT, PIARC 2012

Measures for urban freight transport management

Measure				Example
Traffic Management	Traffic Flow Management	Through-traffic optimization	Infrastructure	Ring roads, bypasses
			Traffic management	Restriction of through-traffic in city
		In/out-flow optimization	Infrastructure	Transshipment terminals outside city
			Traffic management	Truck route designation
	Parking management		Infrastructure	Loading/unloading facility
			Traffic management	Truck-only parking space
	Time management			Limited time window for trucks
	Vehicle management			Low-emission vehicles

Source: PUBLIC SECTOR GOVERNANCE OF URBAN FREIGHT TRANSPORT, PIARC 2012

Measures for urban freight transport management

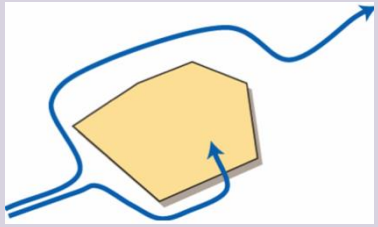
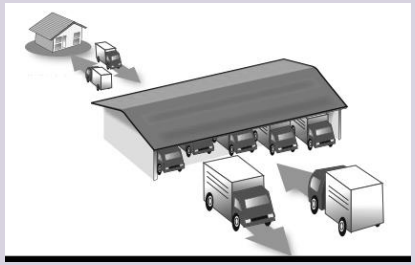
Measure			Example
Better transport method	**Joint delivery**	Infrastructure	Joint delivery center
		Traffic management	Joint delivery agreement
	Intermodal transport	Infrastructure	Intermodal terminals Transshipment equipments
Harmony with urban structure	**Land-use plan**	Infrastructure	Environmental buffer along arterial roads
		Land-use management	Restriction of residential building along arterial roads
Other	**Improve vehicle movement**		ITS, ICT
	Organizational activities		Freight Quality Partnership

Source: PUBLIC SECTOR GOVERNANCE OF URBAN FREIGHT TRANSPORT, PIARC 2012

Public private partnerships (PPP)

- Coordination and cooperation among stakeholders
- Meeting and discussing together urban freight transport issues from the initial stage of planning
- Sharing data and thoughts
- Identifying problems, finding approaches and measures, implementing policy measures, evaluating them and feedback
- Benchmarking
  - Key performance indicators

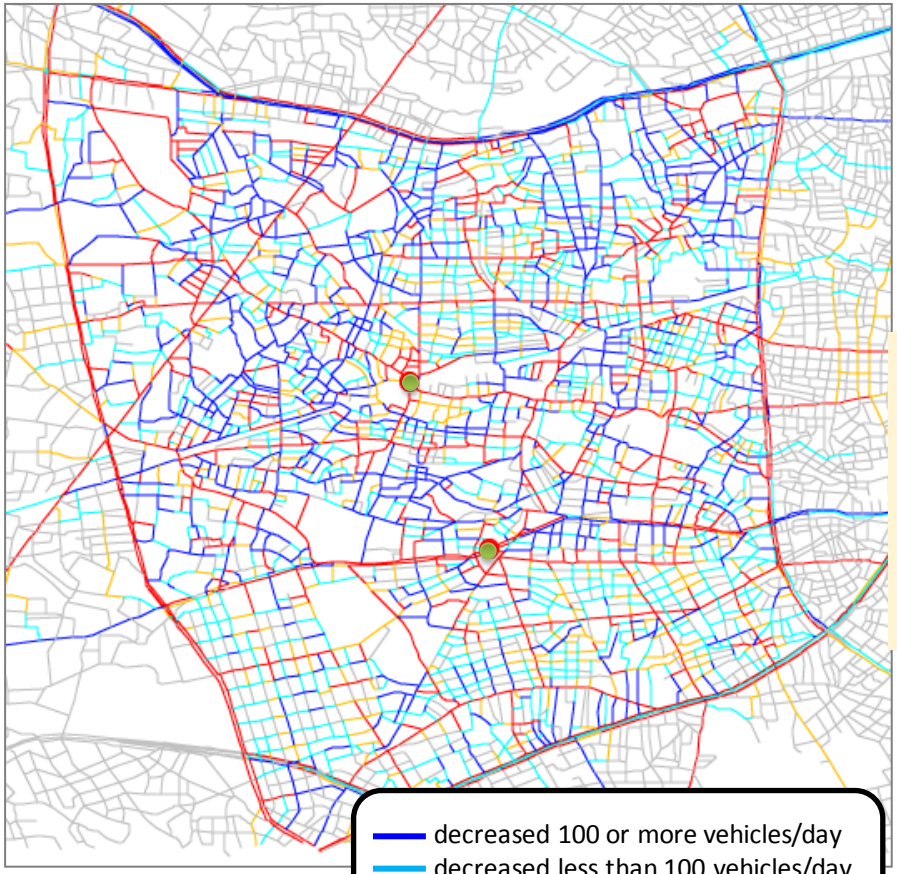
Examples of measures in traffic simulation

	a) Truck route designation	b) In-flow traffic restriction	c) Joint delivery
Description	 Trucks are allowed only on designated routes	 No through-traffic	 Joint delivery
Expected effects	-Reduction in freight transport on local streets -Reduction in environmental burdens and accidents	-Reduction in freight transport in the restricted area -Reduction in environmental burdens and accidents	-Reduction in number of freight vehicles in delivery -Reduction in environmental burdens and accidents

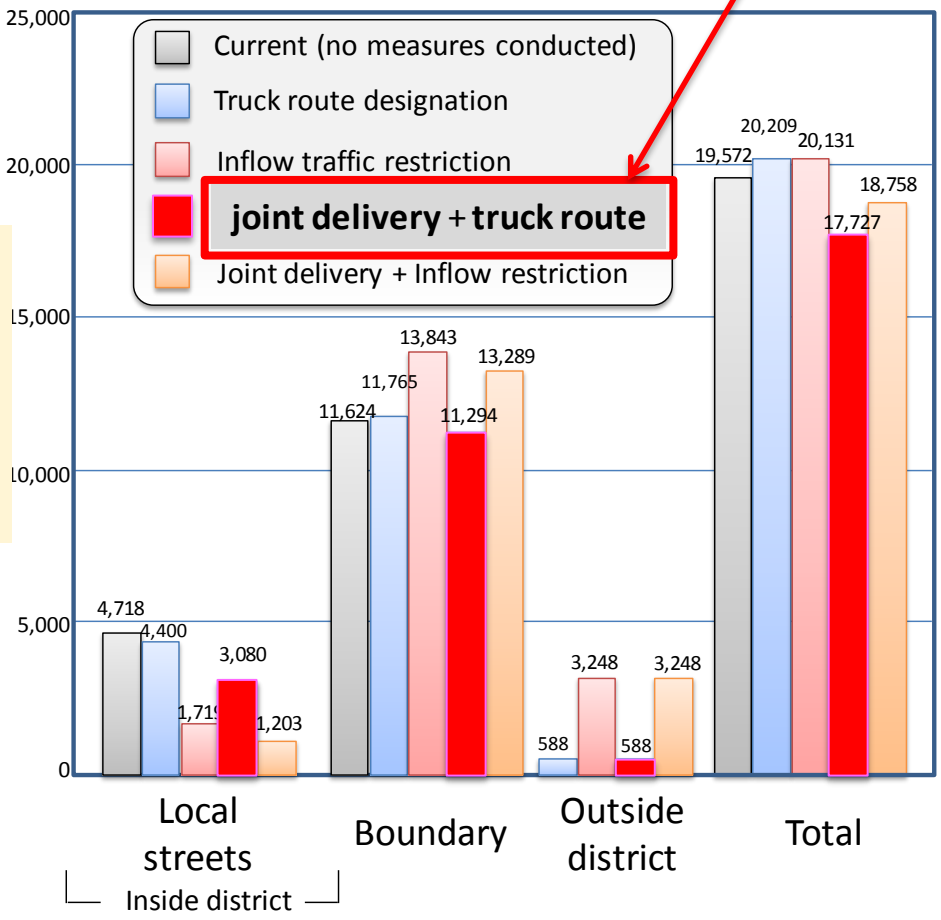
Source: PUBLIC SECTOR GOVERNANCE OF URBAN FREIGHT TRANSPORT, PIARC 2012

Results of Traffic Simulation in Tokyo

ESTIMATED CHANGE IN TRAFFIC VOLUME



Most effective measure package



Source: PUBLIC SECTOR GOVERNANCE OF URBAN FREIGHT TRANSPORT, PIARC 2012

Key Performance Indicators for evaluation

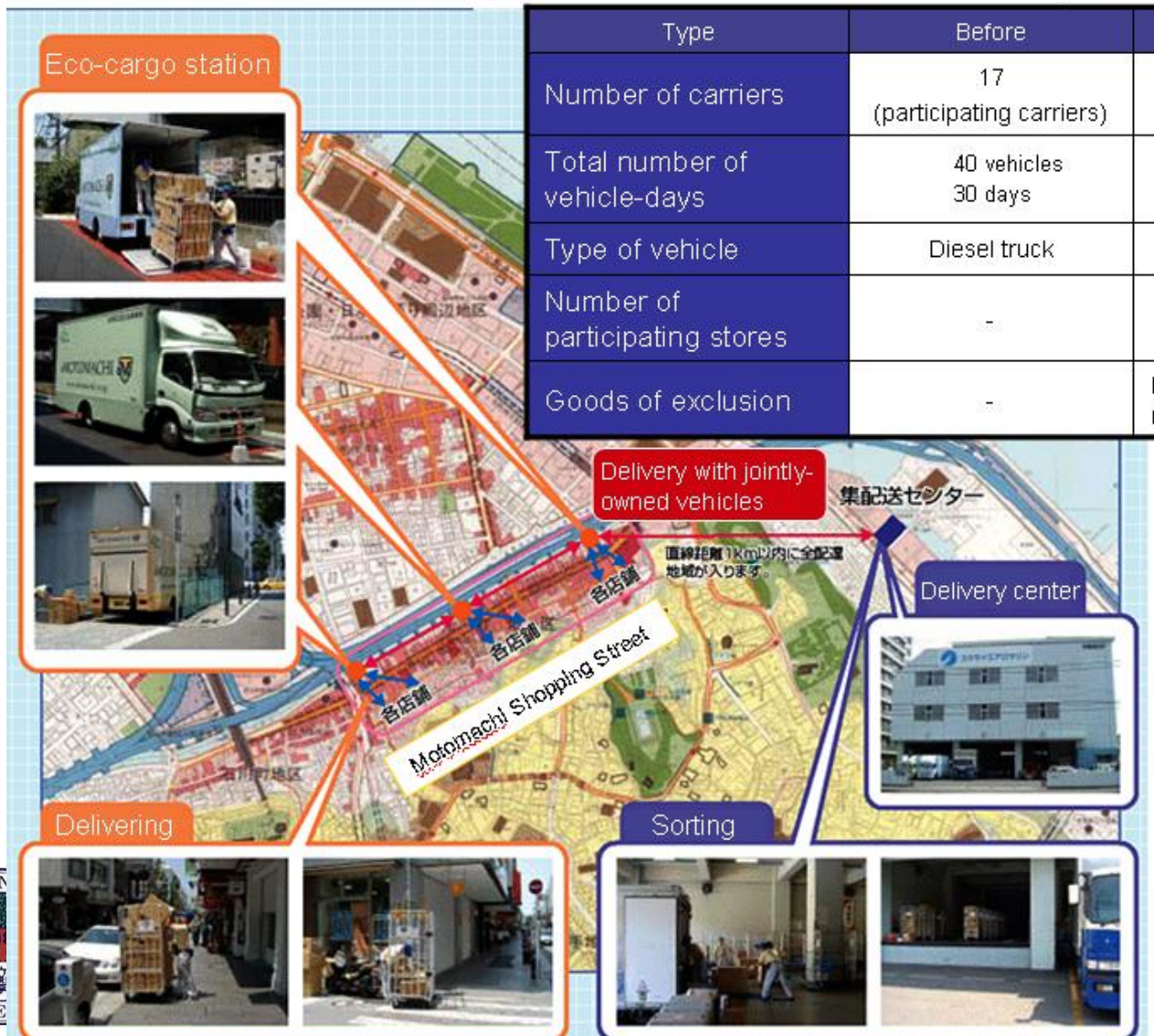
Criteria	Objective	Indicator	Source	Measurement
Life quality	Emissions reduction	-noise -air quality -CO2 -traffic volume -accidents	-field study -local authority -police	-modeling, measurements -traffic counts -literature research
Economic development	Economic development	-Commercial floor space -number of visitors	-local authorities -offices, real state	-statistics -questionnaire study
Accessibility	Improving accessibility	-vehicle-km -travel time -number of obstacles	-carriers -drivers -field study -police	-questionnaire study -traffic counts
Transport efficiency	Improving vehicle load factors	-average load factor of vehicles -fuel consumption per unit	-operators	-study

Source: PUBLIC SECTOR GOVERNANCE OF URBAN FREIGHT TRANSPORT, PIARC 2012

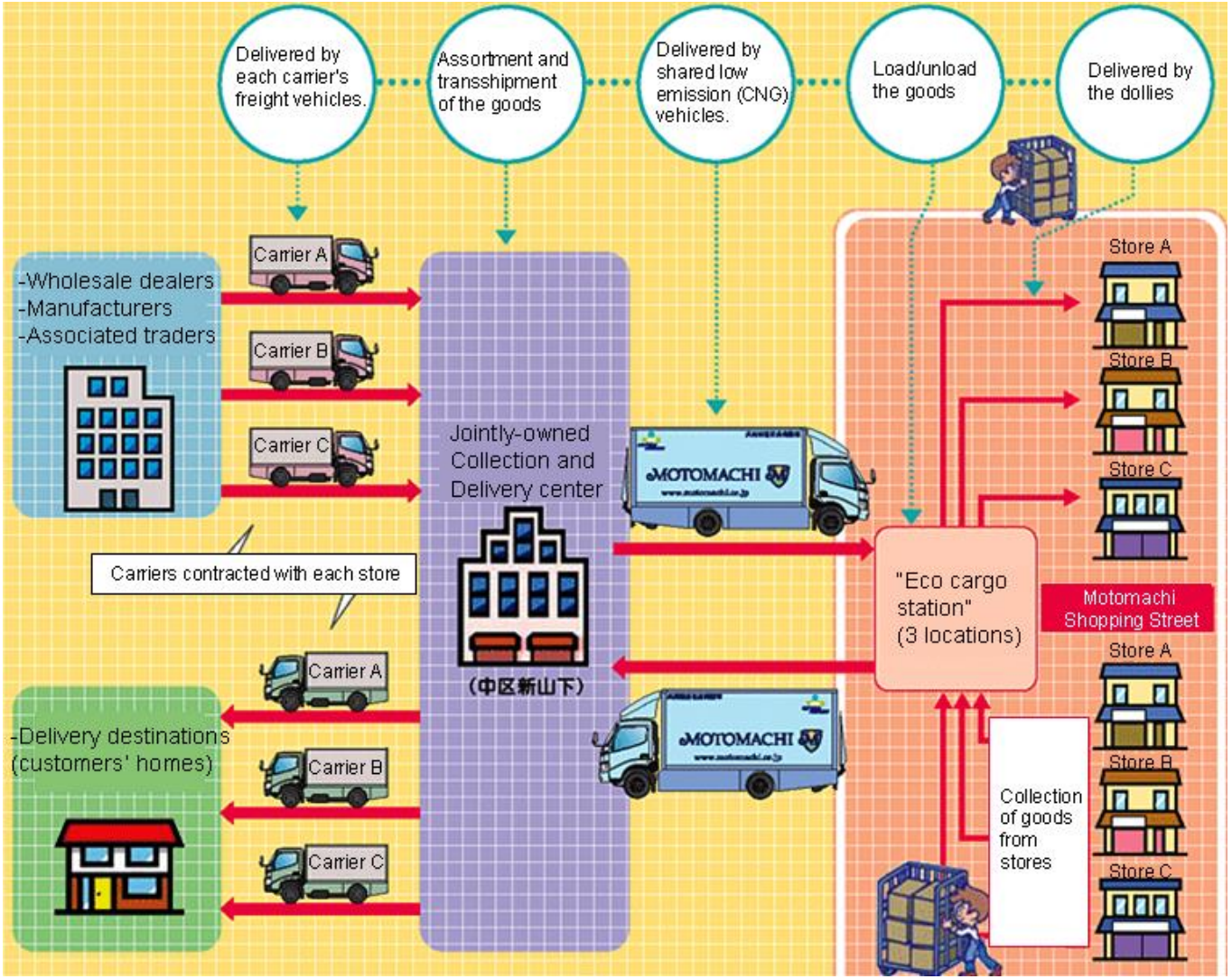
4. Best practices

(1) Urban consolidation centre (Motomachi, Yokohama Japan, 2004-)

Type	Before	After
Number of carriers	17 (participating carriers)	1 (jointly-owned carrier)
Total number of vehicle-days	40 vehicles 30 days	20 vehicles 30 days
Type of vehicle	Diesel truck	CNG truck
Number of participating stores	-	Almost all stores
Goods of exclusion	-	Directly delivered goods from manufactures, High-value items



Structure of cooperative freight transport in Motomachi, Yokohama



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Motomachi shopping street

CNG truck for cooperative freight transport

Eiichi Taniguchi, Kyoto University

Parking area for cooperative freight transport

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Urban consolidation centre

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(2) Urban consolidation centre for high-rise buildings (Shinjuku, Tokyo, 1992-)

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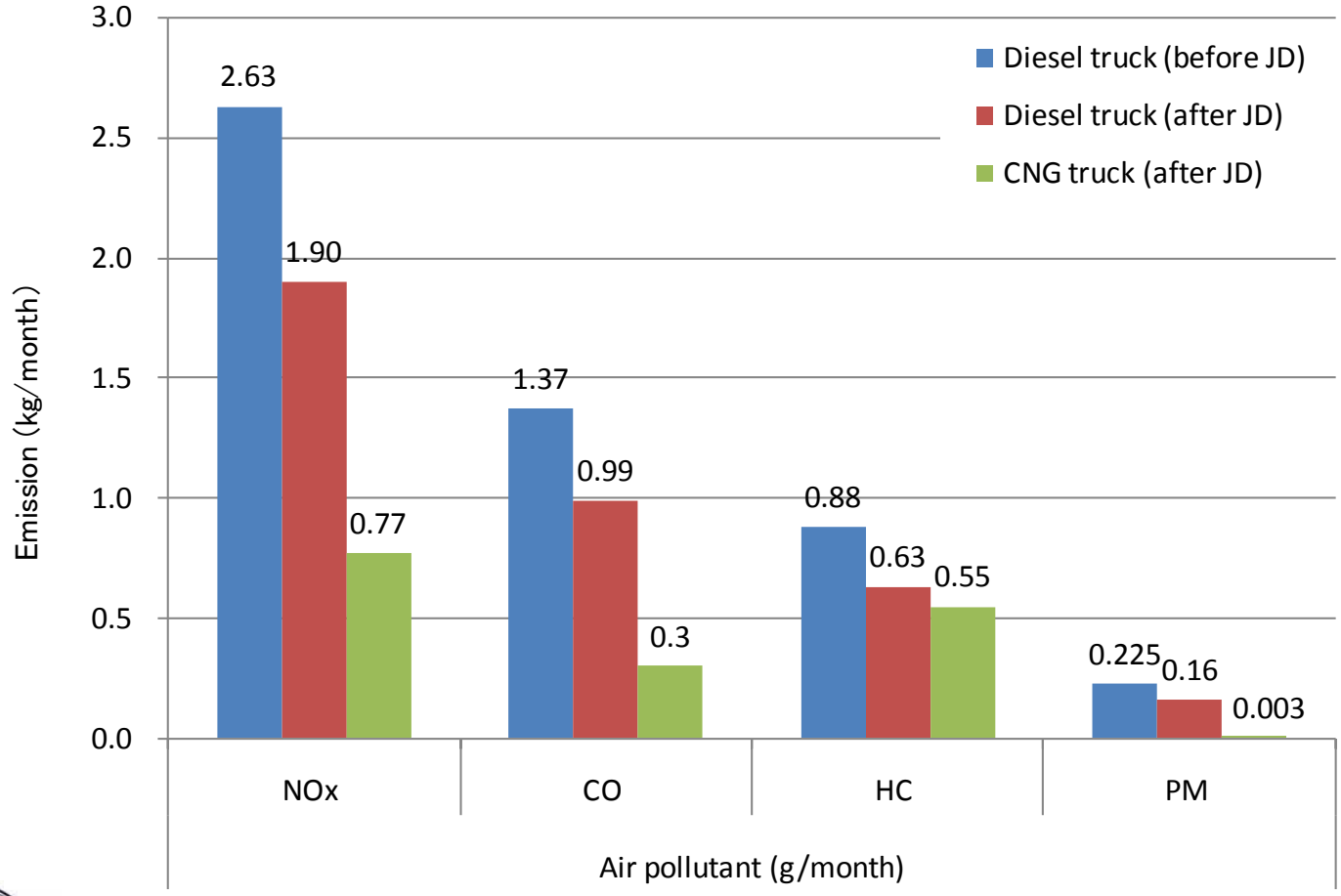
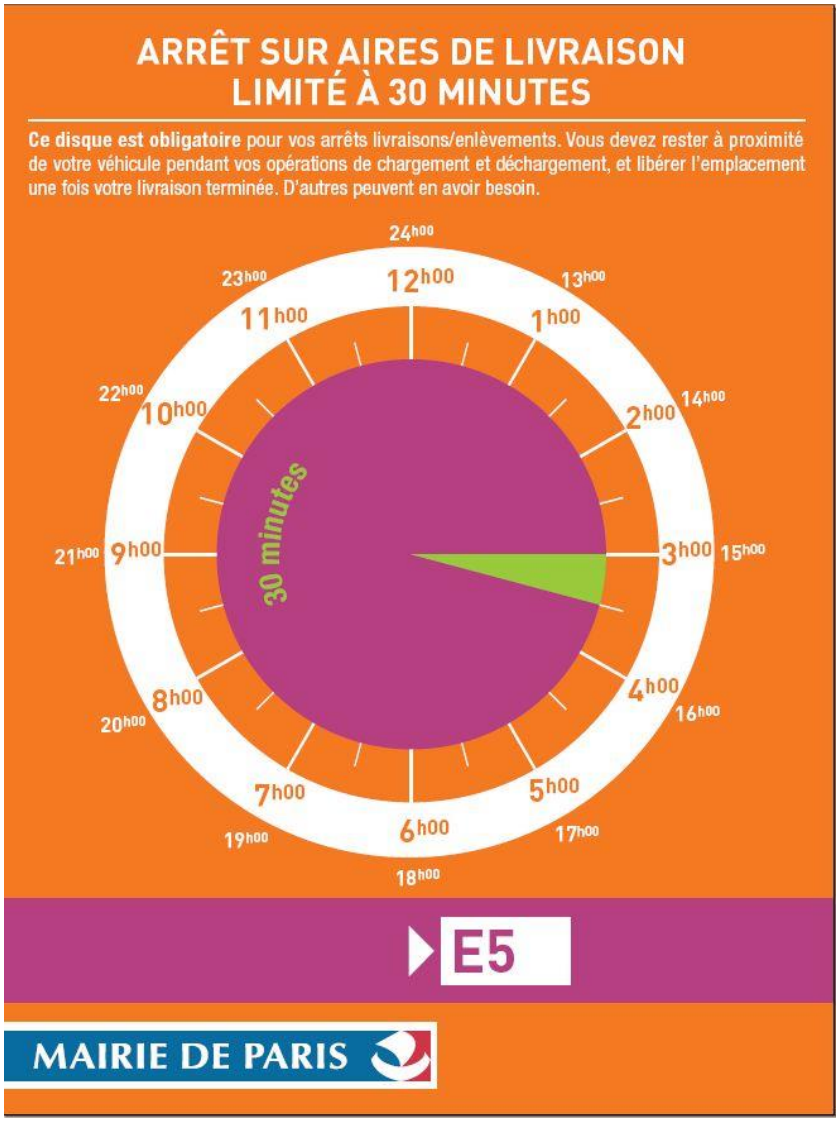
Impacts on air pollutant by urban consolidation centre



(3) Street parking regulation of freight vehicles (Paris, France, 2007-)

Regulation of use of on street loading/unloading space within 30 minutes was introduced to City of Paris in the light of “Charter of Good Practices of Transport and Delivery of Goods” that had been concluded between City of Paris and 47 interested groups in 2006.

The sign of starting time of delivery



(4) Freight operator recognition scheme (London, UK, 2007-)

Freight Operator Recognition Scheme (FORS) is a key project within the London Freight Plan and provides a quality and performance benchmark for the industry. It will benefit London as a whole by encouraging freight companies to priorities safety and reduce their impact on the environment.

-Recognizing and rewarding excellence: 3 levels; Bronze, Silver and Gold
-Raising standards: Educating operators beyond compliance
-Promoting sustainability
-Supports operators to increase safety, environmental awareness and efficiency

(5) Public-private cooperative organisation activity (East Osaka, Japan, 2006-)

1. Eliminating trucks' on-street parking	-Development of logistics parking -Informing the location of parking space
2. Eliminating private cars' on-street parking	-Instructing and raising awareness about illegal street-parking -Tightening of regulations
3. Managing traffic flow	-Traffic restriction into the residential roads -Access route map of the subject area
4. Improving the local environment	-Planting trees and trash picking activities -Idling stop practice


Local problems
Improvement strategy
Action plan
Prepared in Mar. 2007
Activities
Improved living environment
Vitalized business activities
Improved settings for logistics
Local community
Local business
Cargo owners
Improved City Logistics
Freight operators
Police
Offices
Improved settings for freight operation
Improved traffic safety
Improved settings for office work

Parking space dedicated for trucks

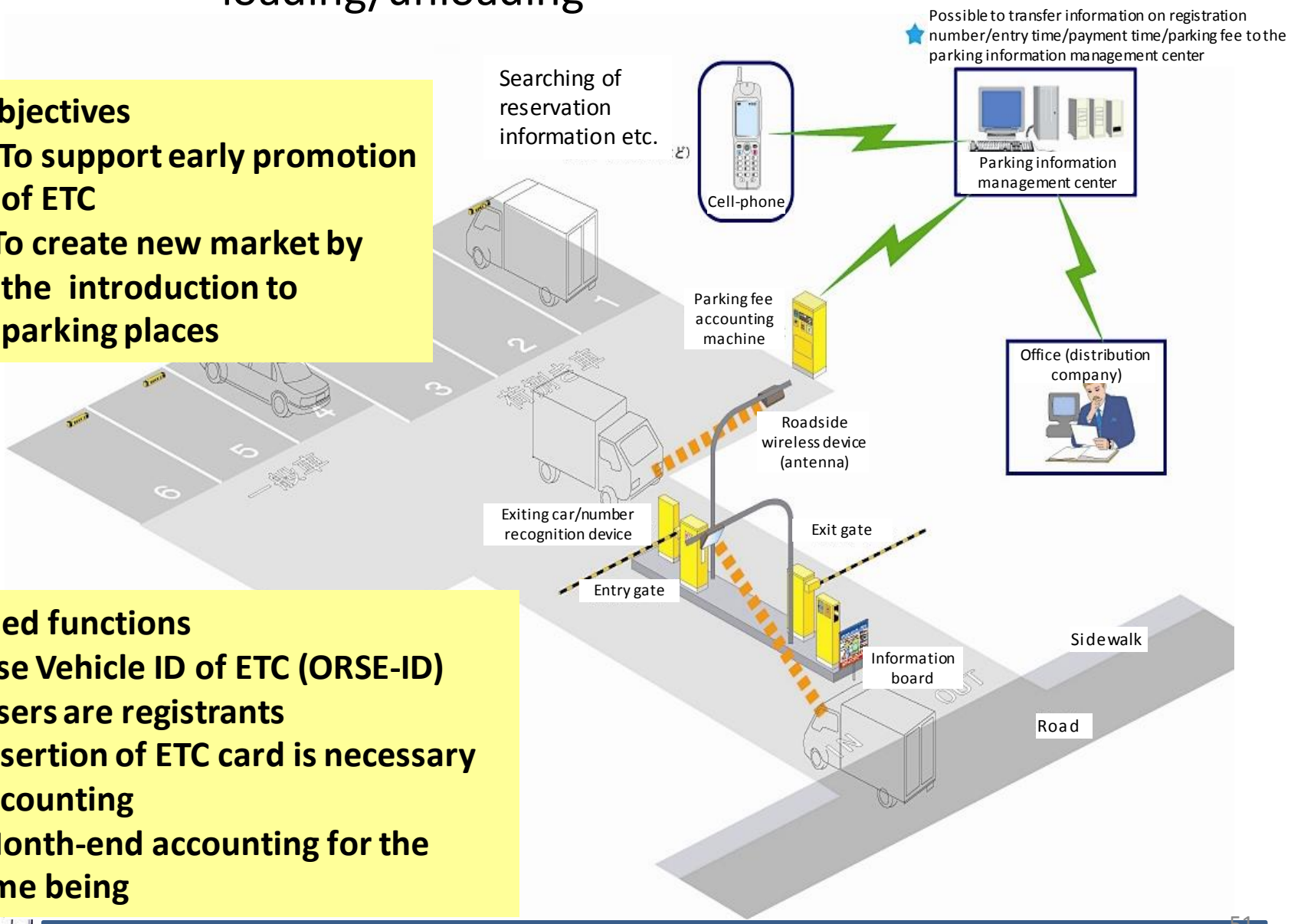
On street parking

Off street parking

(6) Parking lot booking systems using ITS for loading/unloading

（1）Objectives

- **To support early promotion of ETC**
- **To create new market by the introduction to parking places**



（2）Used functions

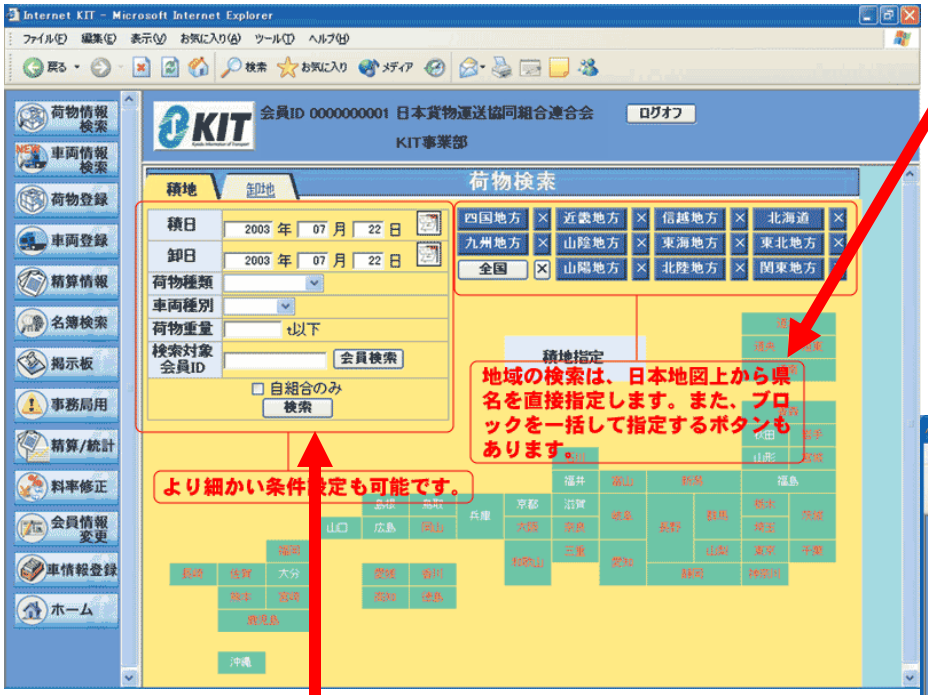
- **Use Vehicle ID of ETC (ORSE-ID)**
- **Users are registrants**
- **Insertion of ETC card is necessary**

（3）Accounting

- **Month-end accounting for the time being**

(7) Truck/load matching system KIT

Click map below directly to select region or click the select all button



Detail search available

Further detail search or sort is available.
Easy to find information you are seeking.

Easy to find the newest information

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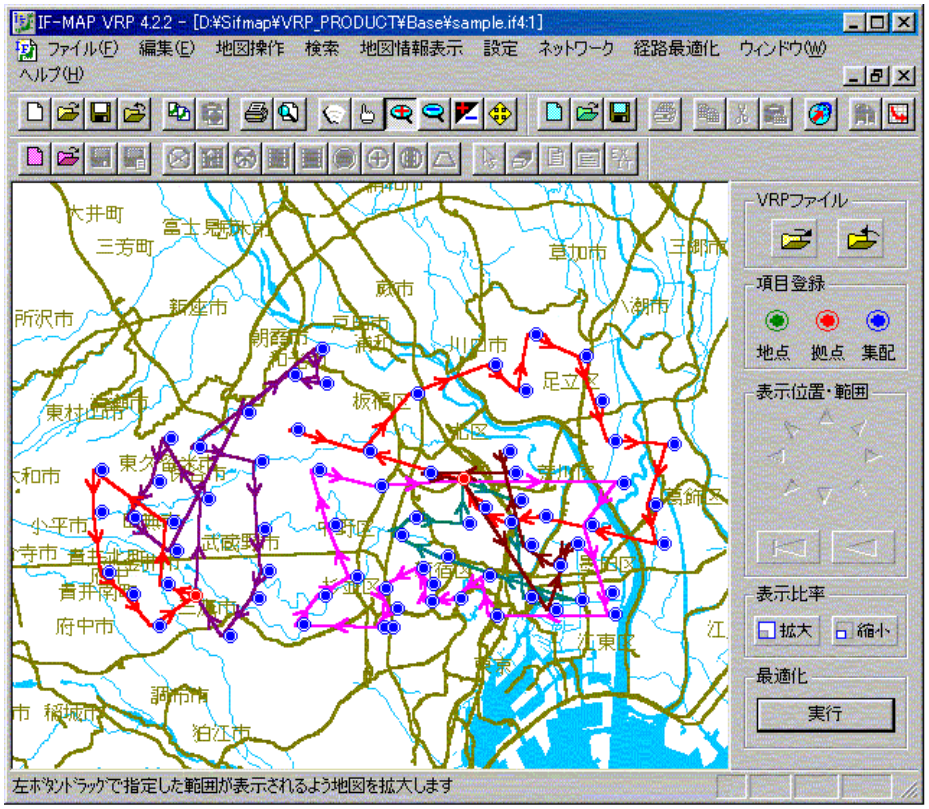
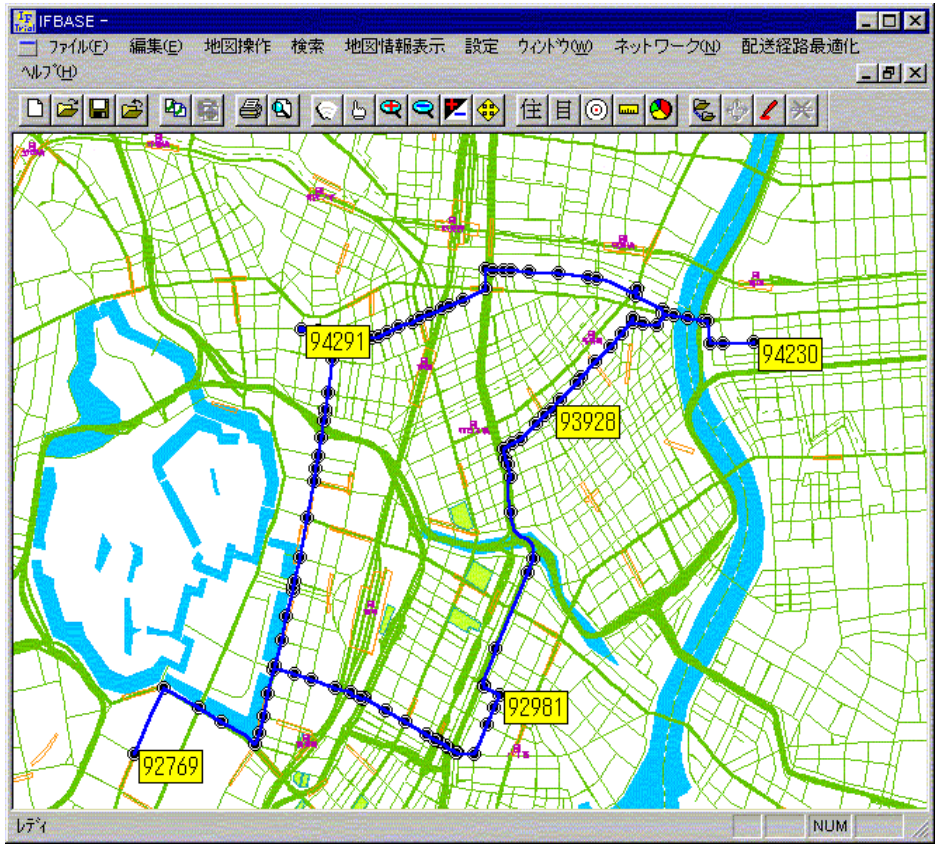
(8) Delivery plan/optimum route



The vehicle allocation and delivery plan support system

Optimum delivery route system



5. Conclusion

- City Logistics provide powerful tool for solving complicated urban freight transport problems
- Efficient and environmentally friendly logistics systems for mobile, sustainable and liveable cities
- Modelling is needed for evaluating policy measures
- Public-Private partnerships play vital role for implementing city logistics schemes

Thank you