CALIFORNIA STATE UNIVERSITY
LONG BEACH
College of Professional and Continuing Education

Planning and Infrastructure Considerations for Freight Systems

Health Effects Institute

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Impacts of Freight Systems and Facilities

Air pollution	Energy consumption	Crashes and accidents	Noise	Other
• From trucks, trains, ships • Diesel particulates, SOX • Human health damages	• GHG emissions and global climate change	• Fatalities and injuries • Lost productivity • Damaged facilities	• Localized impacts of major facilities • Road and highway noise	• Water pollution • Soil pollution • Species and habitat

Consumer-related Impacts

Independent Retailing

- Small scale retailing activities. High frequency of deliveries (3 to 10 times per week). Use of own-account delivery vehicles; mostly small to medium sized. Limited freight reception facilities (the street as the delivery platform).

Chain Retailing

- Large stores and shopping centers. Provision of parking space and loading bays. Consolidated deliveries (large trucks). Reliance of third-party logistics services providers (urban distribution and outsourcing).

Food Deliveries

- Specialized supply chains with goods that are often perishable. Cold chain logistics; used heavily by fast food chains. Outdoor (central) markets (mostly in developing countries).

Parcels and Home Deliveries

- Specialized parcel companies also involved in home deliveries. Large freight integrators (consolidation and deconsolidation of shipments) with a network of distribution centers. Fleet of delivery vehicles (small and medium-sized).

Source: JP Rodrigue, by permission

Producer-related Impacts

Construction Sites

- Construction and renewal of urban infrastructure. Different suppliers according to the construction phase. Large volumes and heavy trucks.

Waste Collection and Disposal

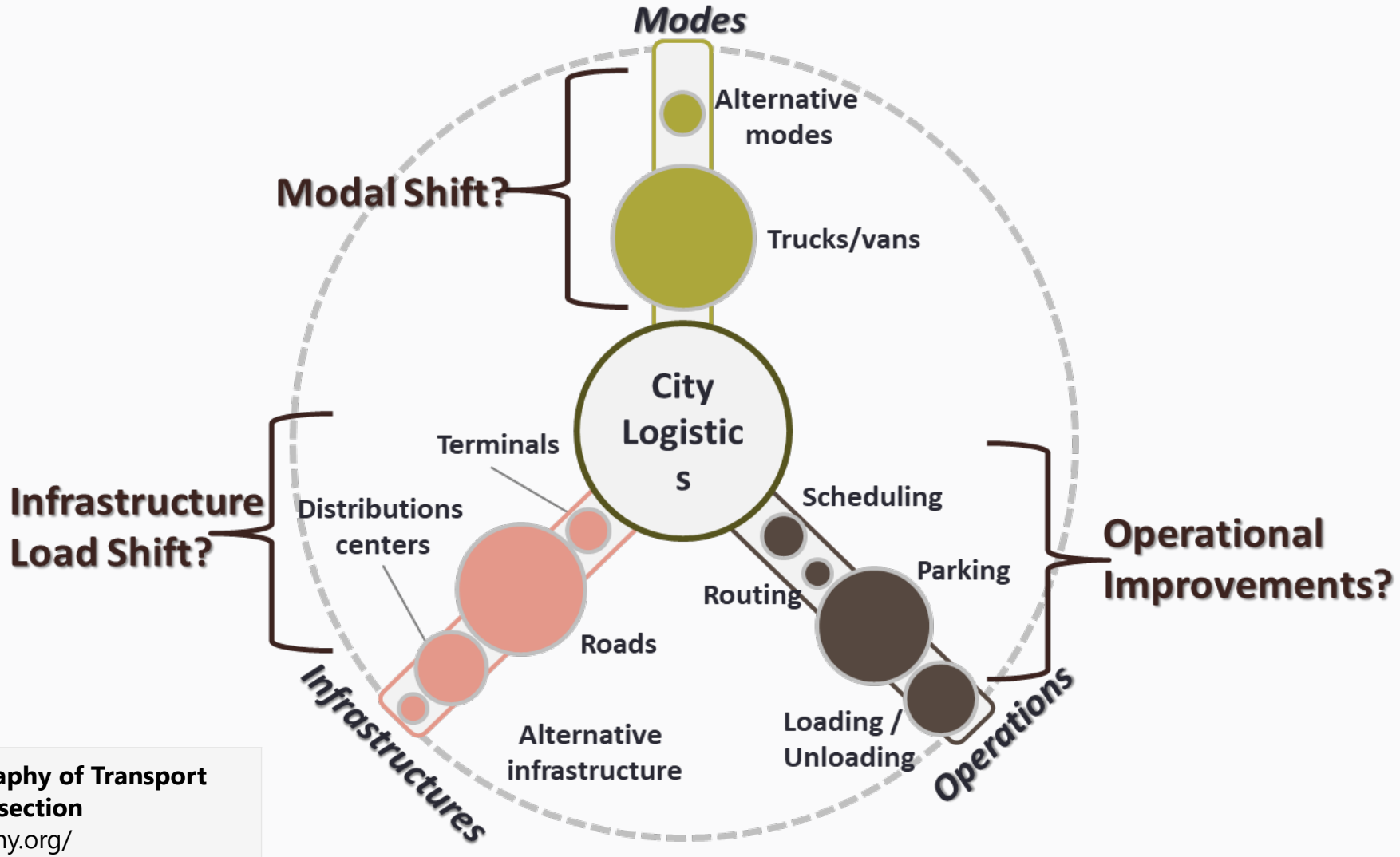
- Collection and disposal of wastes generated by daily urban activities. Reverse logistics and recycling.

Industrial and Terminal Haulage

- Convergence towards transport terminals (ports, airports, railyards), industrial and logistics zones. Significant transit traffic for gateway cities.

Source: JP Rodrigue, by permission

Logistics as a Truck Problem



JP Rodrigue: The Geography of Transport Systems – City Logistics section
https://transportgeography.org/

Main Strategies for Improving Freight Systems

Strategy	Benefits	Challenges
Infrastructure investment Examples: double track rail line, port expansion, grade separated rail/highway crossings, faster vehicles	Adds capacity, alleviates bottlenecks, increases speed and throughput, longer term solution	High cost, land availability, multiple stakeholders, localized impacts, how to allocate cost and who should pay
Demand management Examples: Road and bridge tolls, port access fees	Maximizes efficiency of existing capacity, generates revenue for capacity expansion, increases speed and throughput	Imposes additional costs on some users, politically difficult, requires changes in business practices, not a long-term solution
System management Examples: information systems, ITS, appointment and reservation systems	Increases efficiency of existing capacity, some increase in speed, throughput	Does not manage demand, does not significantly increase capacity, requires changes in business practices

Strategies to Reduce Environmental Impacts

Strategy	Description	Examples
Truck fuel efficiency & emissions standards	National or state fleet-wide targets	California diesel particulate filter standards; EPA 2016 truck standards
Low emission zones	Access to given part of city limited to low emissions vehicles	Milan historic center LEZ; Greater London LEZ
Alternative fuels & vehicles	Incentives, regulations to promote electric, hybrid, other alt fuel trucks or vans	London and Milan congestion charge exemption for AFVs
Alternative modes	Shift freight from truck to rail or water	USDOT marine highways/short sea shipping grant program; Paris Monoprix rail
Community environmental mitigation	Strategies to reduce emissions, noise on low income or minority communities	SCAG Toolkit for goods movement; NYC truck route management study

Strategies to Reduce Trucking Impacts

Strategy	Description	Examples
Negotiated programs	Voluntary program, negotiated between industry and gov't; targets and recognition or special privileges	London Freight Quality Partnership; Paris Delivery Charter
Traffic, parking **regulations**	Local regulations to manage or restrict truck traffic and parking	Paris daytime large truck ban; San Francisco dynamic parking charges
Local planning	Policies, guidelines, zoning codes for site access, on-site parking and loading	NYC, Tokyo loading requirements for new commercial development
City logistics and consolidation	Combine pickups and deliveries across shippers, cargo owners; in-town consolidation facilities	Paris logistics spaces; UK urban consolidation centers; US industry segment consolidation
Off-hours deliveries	Allow deliveries and pickups outside of normal business hours	NYC demonstration; LA/LB ports PierPASS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Implementing the Right Strategy

- Broad implementation of most effective strategies is a challenge
  - Institutional considerations
    - Limited local, state regulatory authority
    - Fragmented governance structure
    - Multiple stakeholders and interest groups
    - Environmental review process
    - Interstate commerce protections (US)
  - Lack of data, analytical tools
  - Technology solutions more promising for longer term
  - Questions re who should pay, source of public funding

Cost Considerations Matter

	Diesel HDT	Battery electric HDT	Hydrogen fuel cell HDT
Price	$ 120,000	$300,000 or more	About $1 million
Availability	Many manufacturers and models	Selected manufacturers	In development and demonstration
Range	500+ miles	100 – 150 miles	500+ miles
Fueling time	Less than 15 min	2 – 4 hours	Less than 30 min
Fueling infrastructure	Widely available	Not available	Not available
Battery weight	N/A	About 5,000 pounds	N/A

Synthesized from Giuliano et al., *Developing Markets for Zero Emission Vehicles in Goods Movement* and *Heavy-Duty Trucks: The Challenge of Getting to Zero*.

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Thank you

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