MF
METROFREIGHT
Volvo Center of Excellence

THE GOOD IMPACTS OF BIKING FOR GOODS: LESSONS FROM PARIS CITY

Principle Investigators: Martin Koning, Ph.D. (IFSTTAR), Alison Conway, Ph.D. (City College of New York)

Project Motivation:

- To address congestion and related externalities, "quantity regulation" was implemented in Paris beginning in 2001.
- Road & parking space previously dedicated for motor vehicles was reallocated to "green" modes, including bicycles.
- While previous studies have assessed the resulting passenger mode shifts and related externalities, none have focused on increased usage of "green" freight modes.

Project Goal:

This project aimed to assess the growing usage of bicycles and tricycles for commercial goods movement in Paris city and to quantify the resulting transport externality savings between 2001 and 2014.

Analysis Method:

Original Survey

- 15 companies providing courier or delivery services to multiple customer in Paris were identified.
- Nine companies participated in an original survey, providing information about operations in 2014 and 2001.

Freight Volume Estimation

- Two indicators of freight activity were estimated for each carrier: total kilometers traveled and total ton-kilometers traveled.
- Estimates for 2014 and 2001 relied directly on individual responses.

Externality Valuation

- Standard values were applied to estimate the monetary value of externality savings.

Sensitivity Analysis

- As both volume estimation and externality valuation calculations were subject to uncertainties, sensitivity analyses were also conducted.

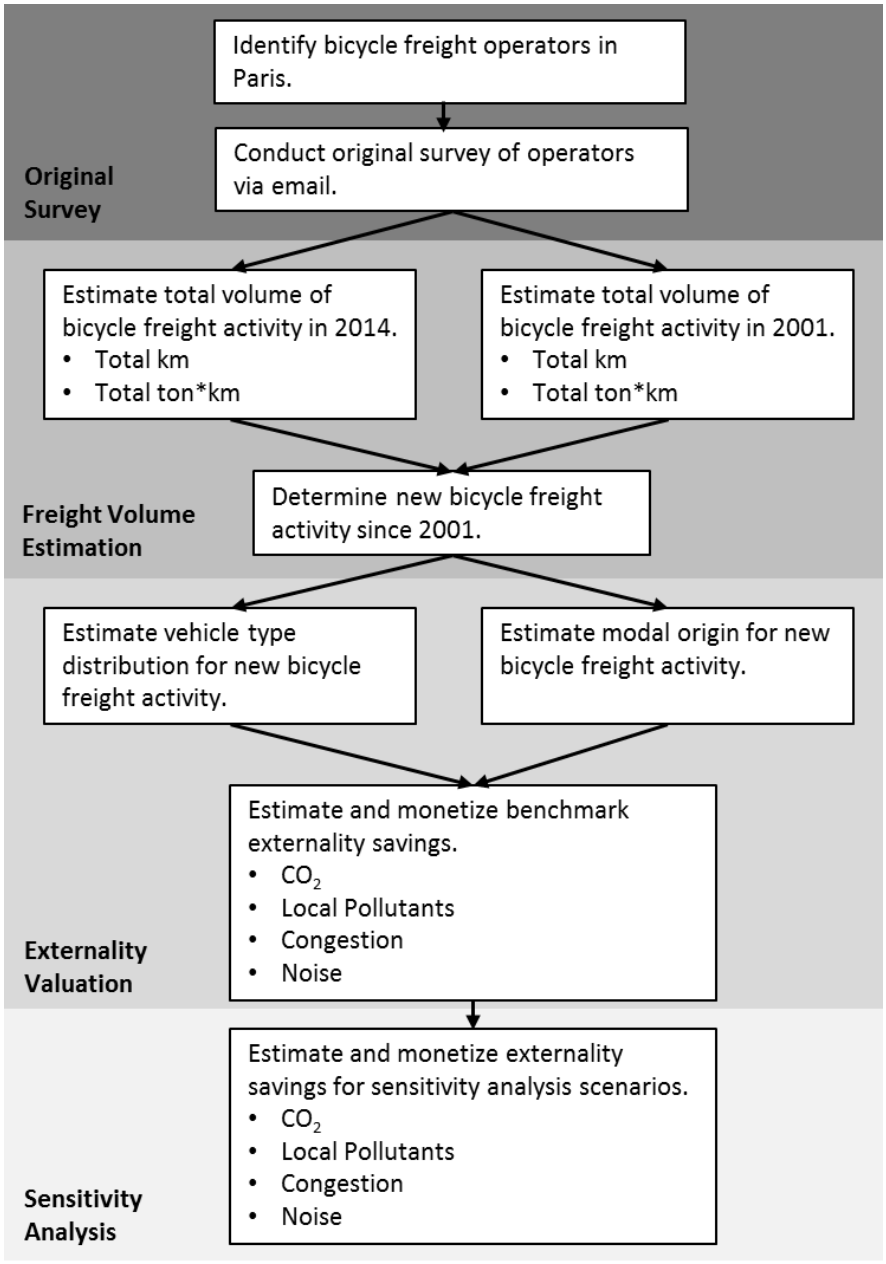

Figure 1. Analysis Procedure

Analysis Results:

Table 1. Benchmark Freight Volume and Externality Savings Estimates

	Δ Freight Volume	Externality Savings Rate				Total Savings
		CO_2	Congestion	Local Pollutants	Noise	
	tkm/day	*euro/tkm*				*euro/day*
Electric cargo cycle	657	0.0001	0	0	0	0
Old M2W	-180	0.161	0	2.548	0.093	-504
Old vans	-612	0.055	7.3	0.89	0.013	-1,703
Old trucks	-53	0.035	2.879	2.237	0.039	-161
Total	-	-64	-1,155	-1,122	-27	**-2,368**

Freight Volume Estimation

- In 2001, two firms carried 42 tkm/day.
- In 2014, 15 firms moved about 980 tkm/day.

Externality Savings

- Annual externality savings of 0.7 M euros are estimated between 2001 and 2014.
- The largest gains come from the reduced usage of vans to move goods in Paris, followed by reductions in motorized two-wheels (M2Ws). Very few trucks were replaced by bicycles or cargo cycles.
- Reduced road congestion and local pollutants are the main drivers of savings; CO_2 and noise savings are very small.

Sensitivity Analysis

Table 2. Externality Savings Sensitivity Analysis

	Daily Externality Savings						
	euros/day						
	Benchmark	**S1**	**S2**	**S3**	**S4**	**S5**	**S6**
Old M2W	-504	-544	-443	-303	-504	-544	-266
Old vans	-1703	-1879	-1528	-1703	-2150	-2371	-1528
Old trucks	-161	-167	-136	-161	-176	-183	-136
Total	-2368	-2589	-2107	-2167	-2830	-3097	-1930

- Scenarios 1 and 2 examine the impacts of a 25% increase and a 25% decrease in the assumed loading for the unobserved firms.
- Scenario 3 increases the assumed M2W load to 0.05 ton/tour.
- Scenario 4 assumes that 35% of goods movements occur during peak hours (compared to benchmark 25 percent).
- Scenarios 5 and 6 combine the assumptions in scenarios 1-4 to evaluate "best" and "worst" case scenarios.

Figure 2. Cargo cycle operated by *The Green Link*

Conclusions and Future Work:

- Operators rely heavily on electrically-assisted cargo cycles, which support around 70% of the tkm carried out by bikes.
- While externality savings are very small relative to total transport externalities in Paris, they are considerable when compared to savings from city-wide passenger mode shifts to bicycle.
- Since this study does not consider bike deliveries by supermarkets and restaurants in Paris, results likely underestimate total externality savings; future studies should include this type of B2C service .
- To address data uncertainties, estimates from this study should be compared with the findings from Paris' recent comprehensive freight survey, which are expected in 2015.

For more information, contact: Martin Koning (martin.koning@ifsttar.fr), Alison Conway (aconway@ccny.cuny.edu)